

- Understanding Common Fee Structures in Orthodontics Understanding Common Fee Structures in Orthodontics Insurance Coverage That Reduces Out of Pocket Costs Exploring Payment Plans and Financing Arrangements Differences Between Flexible Spending and Health Savings Factors Influencing Variations in Treatment Pricing Asking the Right Questions During Cost Consultations Allocation of Funds for Long Term Orthodontic Care Prioritizing Necessary Treatments Within a Budget Navigating Claims and Reimbursements Step by Step How Location Affects Orthodontic Expenses Educating Patients on Financial Planning for Treatment Strategies to Keep Future Costs Predictable
- Role of Licensing and Certification in Orthodontics
  Role of Licensing and Certification in Orthodontics Safeguards That
  Protect Patient Wellbeing Responsibilities of Healthcare Providers in
  Treatment Importance of Proper Clinical Supervision Informed Consent
  and Patient Decision Making Identifying Red Flags in Unsupervised
  Orthodontic Options Maintaining Ethical Standards in Modern Practices
  The Impact of Research on Evidence Based Treatments Open
  Communication as a Pillar of Ethical Care Regulations Governing
  Teledentistry Platforms Balancing Innovation With Patient Protection How
  Professional Guidelines Shape Clinical Judgments
  - About Us



Here's the article outline for 'Understanding Common Fee Structures in Orthodontics' focusing on orthodontic treatment for kids:

Healthcare providers play a crucial role in ensuring successful orthodontic treatment for children. Their responsibilities extend far beyond simply straightening teeth, encompassing a holistic approach to pediatric dental care.

Orthodontic expanders can create more space in the mouth for teeth **Kids' dental alignment services** pediatric dentistry.

First and foremost, orthodontists must conduct comprehensive initial assessments. This involves carefully examining a child's dental structure, jaw alignment, and potential developmental issues. They use advanced diagnostic tools like X-rays and 3D imaging to create personalized treatment plans tailored to each child's unique needs.

Communication is another critical responsibility. Providers must explain treatment options clearly to both parents and children, ensuring they understand the process, potential challenges, and expected outcomes. This involves using age-appropriate language and creating a comfortable, non-intimidating environment that helps children feel at ease.

Monitoring progress is essential throughout the treatment journey. Regular check-ups allow healthcare providers to track tooth movement, make necessary adjustments to braces or aligners, and address any emerging concerns. They must also educate patients about proper oral hygiene, teaching techniques for maintaining dental health during orthodontic treatment.

Emotional support is equally important. Children can feel self-conscious about wearing braces, so providers must offer encouragement and help build their confidence. This might involve discussing potential social challenges and providing strategies for managing them.

Safety is paramount. Healthcare providers must use the most current, evidence-based techniques and ensure all equipment and procedures meet the highest medical standards. They're responsible for minimizing discomfort and potential complications during treatment.

Ultimately, the goal is not just creating a beautiful smile, but promoting long-term dental health and overall well-being for children. By combining technical expertise with compassionate care, orthodontic healthcare providers make a significant difference in young

# Traditional Fee Structures: Per-Treatment Pricing Models

- Here's the article outline for 'Understanding Common Fee Structures in Orthodontics' focusing on orthodontic treatment for kids:
- Traditional Fee Structures: Per-Treatment Pricing Models
- Insurance Coverage and Impact on Orthodontic Expenses
- Payment Plan Options for Pediatric Orthodontic Care
- Factors Influencing Orthodontic Treatment Costs
- Comparing Different Orthodontic Practices and Their Pricing Strategies
- <u>Additional Fees and Potential Hidden Expenses in Orthodontic</u>
  <u>Treatment</u>

Comprehensive Initial Assessment and Diagnosis: A Critical Healthcare Responsibility

When a patient first enters the healthcare system, the comprehensive initial assessment and diagnosis represents a crucial moment that sets the foundation for effective treatment. This process is far more than a simple checklist or routine examination - it's a holistic approach to understanding an individual's health status, needs, and potential challenges.

Healthcare providers must approach this initial assessment with both clinical precision and genuine empathy. The process typically involves gathering a detailed medical history, conducting thorough physical examinations, and utilizing appropriate diagnostic tests. Each step is designed to paint a comprehensive picture of the patient's health, uncovering not just immediate symptoms, but potential underlying conditions and risk factors.

A truly effective initial assessment goes beyond just medical data. It includes understanding the patient's social context, lifestyle, emotional well-being, and personal health goals.

Providers need to create a safe, comfortable environment where patients feel heard and understood. This means active listening, asking thoughtful questions, and demonstrating genuine care.

Diagnostic technologies play an increasingly important role in this process. Advanced imaging, laboratory tests, and specialized screening tools allow healthcare providers to detect conditions with remarkable accuracy. However, these technological tools are most powerful when combined with the provider's clinical expertise and interpersonal skills.

The ultimate goal of a comprehensive initial assessment is to develop a personalized, patientcentered treatment plan. This involves synthesizing all gathered information, identifying potential health risks, and creating a strategic approach to addressing the patient's specific health needs.

By approaching initial assessments with thoroughness, compassion, and professional expertise, healthcare providers can establish a strong foundation for effective, individualized patient care.

# Insurance Coverage and Impact on Orthodontic Expenses

Conducting thorough initial examinations is a critical responsibility for healthcare providers, especially when working with pediatric patients. The process goes far beyond a simple checkup and requires a comprehensive approach that considers the unique developmental stages of children.

When a child first enters the dental office, the healthcare provider must create a welcoming and comfortable environment. The initial examination begins with gathering a detailed dental

history, which involves understanding the child's past medical experiences, any existing health conditions, and family dental background. This conversation helps build trust and provides valuable insights into potential genetic or environmental factors that might impact dental health.

The physical assessment is a meticulous process that involves carefully examining the child's oral structures, teeth alignment, jaw development, and overall oral hygiene. Providers look for signs of potential orthodontic issues, such as crowding, misalignment, or abnormal bite patterns. Each developmental stage presents different challenges and opportunities for intervention.

X-rays play a crucial role in this comprehensive examination. They allow healthcare providers to see beyond the visible surface, revealing underlying structures, potential emerging teeth, and any hidden developmental concerns. For younger children, these imaging techniques are performed with minimal radiation and maximum care to ensure patient safety.

Identifying potential orthodontic issues early is particularly important. By catching misalignments or structural concerns during childhood, providers can develop proactive treatment plans that may prevent more complex interventions later. This might involve recommending early orthodontic consultations, suggesting specific oral hygiene techniques, or monitoring growth patterns.

The goal is not just to treat existing issues but to educate and prevent future dental problems. Healthcare providers must communicate clearly with both the child and parents, explaining findings in an age-appropriate and reassuring manner.

Each examination is a unique journey, tailored to the individual child's needs, growth, and specific oral health landscape. It's a delicate balance of professional expertise, compassionate care, and forward-thinking medical intervention.

# Payment Plan Options for Pediatric Orthodontic Care

Personalized Treatment Planning: A Patient-Centered Approach

In today's complex healthcare landscape, personalized treatment planning has become a critical responsibility for healthcare providers. Gone are the days of one-size-fits-all medical approaches. Modern healthcare demands a more nuanced, individualized strategy that considers each patient's unique medical history, genetic makeup, lifestyle, and personal preferences.

Healthcare providers play a crucial role in developing these tailored treatment plans. This process begins with comprehensive patient assessment, where clinicians gather detailed information about the patient's medical background, current health status, and specific health challenges. It's not just about collecting data, but truly understanding the patient as a whole person.

The art of personalized treatment planning involves collaborative decision-making. Providers must engage patients in meaningful conversations, explaining treatment options, potential risks, and expected outcomes. This approach empowers patients to become active participants in their own healthcare journey, fostering a sense of trust and partnership between the patient and healthcare team.

Modern technology has significantly enhanced our ability to create personalized treatment plans. Genetic testing, advanced diagnostic tools, and sophisticated medical algorithms allow providers to develop more precise and targeted interventions. For instance, in oncology, genetic profiling can help determine the most effective treatment approach for individual cancer patients.

However, personalized treatment planning isn't just about medical precision. It's about compassion, communication, and holistic care. Providers must consider not only the clinical aspects of treatment but also the patient's emotional, psychological, and social needs. This might involve coordinating with mental health professionals, addressing financial concerns, or providing additional support resources.

Ultimately, personalized treatment planning represents the evolution of patient care. It reflects a deeper understanding that each patient is unique, with their own set of circumstances, challenges, and potential for healing. By embracing this approach, healthcare providers can

As medical science continues to advance, the importance of personalized treatment planning will only grow. It's a powerful testament to the medical profession's commitment to treating patients as individuals, not just medical cases.

# Factors Influencing Orthodontic Treatment Costs

In the world of pediatric dentistry and orthodontics, developing individualized treatment strategies isn't just a technical process-it's an art form that requires deep understanding, compassion, and precision. Every child's dental journey is unique, much like their fingerprints, and healthcare providers must recognize this fundamental truth.

When approaching orthodontic care, professionals must look beyond standard protocols and truly see the individual patient. A one-size-fits-all approach simply doesn't work. Each child's dental structure tells a story-of genetics, growth patterns, potential challenges, and future possibilities.

Consider, for instance, how a child's age dramatically impacts treatment options. A strategy suitable for an 8-year-old will look dramatically different from one designed for a 14-year-old. Growth stages, bone density, tooth eruption patterns, and potential developmental issues all play critical roles in crafting an effective treatment plan.

Healthcare providers must become part detective, part artist, carefully assessing each child's specific orthodontic requirements. This means conducting comprehensive evaluations that go far beyond simple measurements. They must understand how jaw alignment, tooth spacing, bite dynamics, and potential future growth will interact.

Modern orthodontic care demands a holistic perspective. Providers aren't just straightening teeth; they're supporting a child's overall oral health, self-confidence, and long-term developmental trajectory. Each treatment plan becomes a personalized roadmap, designed with precision and empathy.

Technology now supports this individualized approach, with advanced imaging, 3D modeling, and predictive software helping professionals create increasingly tailored strategies. Yet, the human element remains paramount-understanding each child's unique needs, fears, and potential.

Ultimately, developing individualized treatment strategies is about seeing each child as a complete, complex individual-not just a set of teeth to be adjusted, but a growing person whose dental health will impact their entire life journey.

# Comparing Different Orthodontic Practices and Their Pricing Strategies

Patient and Parent Education: A Critical Responsibility of Healthcare Providers

In the complex world of healthcare, education is far more than just sharing medical information-it's about empowering patients and families to actively participate in their own care journey. Healthcare providers have a fundamental responsibility to ensure that patients and parents understand not just their medical conditions, but also the entire treatment process.

Effective patient and parent education starts with clear, compassionate communication. Medical professionals must break down complex medical terminology into simple, understandable language. It's not about overwhelming people with technical details, but helping them truly comprehend their health situation.

For parents, especially those dealing with pediatric care, education becomes even more crucial. They need to understand treatment plans, medication schedules, potential side effects, and home care instructions. This knowledge helps them become confident caregivers who can support their child's recovery and well-being.

The education process should be interactive and personalized. Every patient and family has unique needs, backgrounds, and learning styles. Healthcare providers must be adaptable, using various methods like verbal explanations, written materials, visual aids, and digital resources to ensure understanding.

Moreover, good education builds trust. When patients and parents feel informed and heard, they're more likely to follow treatment plans, ask important questions, and maintain open communication with healthcare teams. This collaborative approach significantly improves treatment outcomes and patient satisfaction.

Ultimately, patient and parent education is about respect-respecting individuals' right to understand their own health and empowering them to make informed decisions. It's a critical responsibility that goes beyond medical treatment, touching the very heart of compassionate healthcare.

# Additional Fees and Potential Hidden Expenses in

# **Orthodontic Treatment**

When it comes to orthodontic treatment for children, communication is absolutely key. Healthcare providers have a crucial responsibility to break down complex medical information into digestible, age-appropriate explanations that both children and their parents can understand and feel comfortable with.

Imagine a young patient sitting in the orthodontic chair, feeling nervous and uncertain. A skilled healthcare provider knows how to transform that anxiety into curiosity and understanding. They'll use simple language, perhaps even visual aids or analogies that resonate with a child's world. Instead of technical jargon, they might compare braces to a "smile transformation journey" or explain tooth alignment like putting together a puzzle.

For parents, the communication needs to be equally clear but more detailed. They want to understand the treatment plan, potential outcomes, financial implications, and what role they'll play in their child's orthodontic care. A good healthcare provider will walk them through each step, addressing concerns, setting realistic expectations, and providing comprehensive home care instructions.

This approach isn't just about information transfer-it's about building trust. When children and parents feel informed and heard, they're more likely to be active participants in the treatment process. They'll be more diligent about following instructions, attending appointments, and maintaining proper oral hygiene.

Effective communication also reduces fear and uncertainty. By demystifying orthodontic procedures and explaining what to expect, healthcare providers can help create a positive, empowering experience for young patients.

Ultimately, providing clear, age-appropriate explanations is more than a responsibility-it's an art that transforms a potentially intimidating medical procedure into an exciting journey of

personal transformation.

Monitoring Treatment Progress: A Critical Responsibility

Healthcare providers play a crucial role in tracking and evaluating patient progress throughout their treatment journey. This ongoing assessment isn't just a bureaucratic checkbox-it's a fundamental aspect of delivering high-quality, patient-centered care.

When monitoring treatment progress, providers must be both systematic and compassionate. They typically use a combination of clinical assessments, patient-reported experiences, and objective medical measurements. For instance, a patient undergoing treatment for chronic diabetes might have their blood sugar levels regularly checked, while simultaneously discussing how the treatment impacts their daily life.

The process involves multiple key steps. First, providers establish baseline measurements at the beginning of treatment. Then, they conduct periodic evaluations to compare current health status against these initial benchmarks. These check-ins help determine whether the current treatment strategy is effective or needs adjustment.

Modern technology has significantly enhanced this monitoring process. Electronic health records allow for more comprehensive tracking, enabling healthcare professionals to quickly identify trends and potential issues. Wearable devices and digital health platforms also provide real-time data that can supplement traditional medical assessments.

However, monitoring isn't just about numbers and charts. It's about understanding the patient's holistic experience. A good healthcare provider listens carefully to patient feedback, recognizing that medical data tells only part of the story.

Ultimately, effective treatment progress monitoring ensures patients receive personalized, responsive care that adapts to their changing health needs. It's a dynamic, collaborative process that requires skill, empathy, and continuous attention.

Monitoring and Adapting Orthodontic Care: A Continuous Journey

Orthodontic treatment is far more than simply placing braces or aligners on a patient's teeth. It's a dynamic, ongoing process that requires constant attention, assessment, and adaptation. Healthcare providers play a crucial role in ensuring the effectiveness and success of orthodontic interventions through diligent tracking and evaluation.

At the heart of this responsibility is the commitment to regular monitoring. During each followup appointment, orthodontists carefully examine the progress of tooth alignment, checking how teeth are moving and responding to the current treatment plan. This isn't just a casual glance, but a comprehensive assessment that involves detailed measurements, digital imaging, and careful analysis of the patient's dental development.

The real art of orthodontic care lies in the ability to make timely and precise adjustments. No two patients are exactly alike, and treatment plans must be flexible enough to accommodate individual variations in dental structure, growth patterns, and response to intervention. Sometimes this might mean slightly modifying the pressure of braces, changing the configuration of aligners, or even adjusting the overall treatment strategy.

Young patients, in particular, require special attention. As children grow, their dental anatomy changes, which means the orthodontic approach must evolve accordingly. Regular check-ups allow healthcare providers to track not just tooth alignment, but also jaw development, bite relationship, and overall oral health.

Technology has become an invaluable ally in this process. Advanced digital scanning, 3D imaging, and computer-assisted treatment planning enable orthodontists to track progress with unprecedented precision. These tools help create more personalized and effective treatment strategies.

Ultimately, the goal is to achieve not just straight teeth, but optimal dental health and function. This requires a holistic approach that goes beyond cosmetic considerations, focusing on long-term oral well-being and the patient's overall quality of life.

By maintaining a proactive, patient-centered approach to monitoring and adjusting orthodontic treatments, healthcare providers ensure that each individual receives the most effective, personalized care possible.

Psychological Support and Comfort: A Crucial Aspect of Healthcare Providers' Responsibilities

When we think about healthcare, our minds often jump to medical treatments, surgeries, and medications. However, there's a deeply human element that's equally important: psychological support and comfort. Healthcare providers aren't just treating physical symptoms; they're caring for whole human beings with complex emotional needs.

Imagine being in a hospital bed, vulnerable and scared. A compassionate healthcare provider who takes a moment to truly listen can make an enormous difference. It's not just about medical expertise, but about creating a sense of safety and understanding. Doctors, nurses, and other medical professionals play a critical role in helping patients navigate the emotional challenges of illness and treatment.

This support takes many forms. Sometimes it's a gentle explanation of a diagnosis, helping patients understand their condition without overwhelming them. Other times, it's holding a patient's hand during a difficult moment or offering words of encouragement. Psychological comfort can reduce anxiety, improve patient cooperation, and even contribute to better healing outcomes.

For patients facing serious or chronic conditions, emotional support becomes even more crucial. Healthcare providers must be sensitive to the fear, grief, and uncertainty that often accompany serious health challenges. They need to create a supportive environment where patients feel heard, respected, and cared for beyond their physical symptoms.

Training in empathy and communication is key. Healthcare professionals need to develop skills that go beyond medical knowledge - skills that allow them to connect with patients on a human level. It's about seeing the person, not just the patient.

Of course, providing psychological support isn't always easy. Healthcare providers themselves face significant emotional challenges, and maintaining compassion while managing their own stress is a delicate balance. Yet, it remains one of the most important aspects of quality healthcare.

In the end, healing is about more than just treating an illness. It's about supporting the entire human experience of health, vulnerability, and hope.

Addressing Children's Emotional Needs During Orthodontic Treatment

Orthodontic procedures can be intimidating for children, often triggering anxiety and fear. Healthcare providers play a crucial role in creating a supportive and compassionate environment that helps young patients feel safe and comfortable during their treatment.

The first step in managing children's emotional well-being is building trust. This begins from the very first consultation, where dentists and orthodontists should use age-appropriate communication, speak in gentle tones, and explain procedures in simple, non-threatening language. Children are perceptive and can quickly sense genuine care and empathy.

Creating a child-friendly environment is equally important. This might involve designing waiting areas with colorful decorations, providing child-sized furniture, and using visual aids that help explain treatments in an engaging manner. Some practices even incorporate interactive elements like educational videos or playful illustrations that demystify orthodontic procedures.

Healthcare providers should also focus on positive reinforcement. Praising children for their bravery, offering small rewards, and maintaining a calm, reassuring demeanor can significantly reduce anxiety. By transforming potentially scary medical experiences into manageable, even enjoyable interactions, professionals can help children develop a healthy attitude towards dental care.

Involving parents in the process and teaching them strategies to support their children's emotional needs is another critical aspect. Providers can offer guidance on how to discuss treatments, manage pre-appointment anxiety, and provide comfort during and after procedures.

Ultimately, the goal is to create a holistic approach that addresses not just the physical aspects of orthodontic treatment, but also the emotional and psychological well-being of young patients.

Preventive and Corrective Interventions: A Healthcare Provider's Crucial Responsibilities

Healthcare providers play a pivotal role in patient care, with preventive and corrective interventions forming the cornerstone of effective medical treatment. These approaches are not just medical procedures, but a comprehensive strategy to maintain and improve patient health.

Preventive interventions are proactive measures designed to stop potential health issues before they develop. This includes routine check-ups, vaccinations, health screenings, and patient education about lifestyle choices. For instance, a primary care physician might recommend regular blood pressure monitoring, cholesterol screenings, or discuss diet and exercise to prevent chronic conditions like diabetes or heart disease.

Corrective interventions, on the other hand, focus on addressing existing health problems. These range from medical treatments and surgical procedures to rehabilitation and ongoing management of chronic conditions. When a patient presents with a specific health issue, healthcare providers must carefully diagnose the problem and develop a targeted treatment plan.

The most effective healthcare approach combines both preventive and corrective strategies. Providers must maintain open communication with patients, understanding their medical history, lifestyle, and individual health risks. This personalized approach allows for more precise and effective interventions.

Technology and medical research continue to enhance these interventions. Advanced diagnostic tools, personalized medicine, and comprehensive patient tracking systems enable healthcare providers to deliver more accurate and timely care.

Ultimately, the goal of these interventions is to improve patient outcomes, reduce healthcare costs, and enhance overall quality of life. By focusing on both prevention and correction, healthcare providers can make a significant difference in individual and community health.

Implementing Timely Orthodontic Treatments: A Critical Responsibility

As healthcare providers, we play a crucial role in ensuring children's long-term dental health through proactive and strategic orthodontic interventions. Orthodontic treatments are far more than just cosmetic procedures; they are essential medical interventions that can significantly impact a child's overall oral development and future quality of life.

Early detection of dental misalignments is key. By carefully monitoring children's dental growth during routine check-ups, healthcare providers can identify potential issues before they become complex problems. This might involve tracking tooth positioning, jaw development, and bite alignment from a very young age.

The benefits of timely orthodontic treatment extend well beyond aesthetic considerations. Proper alignment can prevent future complications like uneven tooth wear, jaw pain, speech difficulties, and potential digestive issues caused by improper chewing. Moreover, correcting misalignments early can boost a child's self-confidence and prevent more invasive treatments later in life.

Modern orthodontic approaches are increasingly sophisticated. We now have a range of options, from traditional braces to innovative clear aligners, allowing us to customize treatments to each child's unique dental structure. The goal is always to guide dental development gently and effectively, minimizing discomfort and maximizing long-term oral health outcomes.

Collaboration with parents is also critical. By educating families about the importance of early orthodontic intervention and providing clear, compassionate guidance, we can help children develop healthy dental habits and attitudes that will serve them throughout their lives.

Ultimately, implementing timely orthodontic treatments represents our commitment to comprehensive pediatric healthcare - a holistic approach that looks beyond immediate symptoms to support children's overall well-being.

Coordination with Other Healthcare Professionals

In the complex world of modern healthcare, effective coordination among different healthcare professionals is not just a nice-to-have-it's absolutely essential for delivering high-quality patient care. When doctors, nurses, specialists, therapists, and other medical professionals work together seamlessly, patients benefit from a more comprehensive and holistic approach to treatment.

Imagine a patient with a complicated medical condition. They might need input from a primary care physician, a specialist, a pharmacist, and potentially a physical therapist or mental health counselor. Without proper coordination, these professionals could work in isolation, potentially missing critical insights or creating gaps in the patient's care.

Effective coordination involves clear communication, shared electronic health records, regular case conferences, and a collaborative approach to treatment planning. Healthcare providers must be willing to listen to each other, share relevant information, and work towards a unified

treatment strategy.

Technology has significantly improved this coordination in recent years. Electronic medical records allow instant sharing of patient information, while telemedicine platforms enable quick consultations between professionals across different locations.

The ultimate goal of this coordination is always the patient. By breaking down professional silos and fostering a team-based approach, healthcare providers can ensure more accurate diagnoses, more effective treatments, and ultimately, better patient outcomes.

While challenges remain, the healthcare industry is increasingly recognizing the critical importance of professional collaboration. As medical knowledge becomes more specialized, the need for seamless coordination will only continue to grow.

In the world of pediatric dental care, collaboration is key to providing the best possible treatment for young patients. Healthcare providers understand that a child's oral health is a complex and multifaceted journey that requires a team-based approach.

Pediatric dentists, oral surgeons, and other specialists work together to create a comprehensive care plan that addresses every aspect of a child's dental well-being. This isn't just about treating immediate concerns, but about developing a holistic strategy that supports long-term oral health.

For instance, a pediatric dentist might identify a complex dental issue that requires the expertise of an oral surgeon. By communicating effectively and sharing detailed patient information, these professionals can coordinate treatments that minimize stress and maximize outcomes for the child. An orthodontist might be brought in to address alignment issues, while a pediatric specialist can manage any underlying developmental concerns.

The collaborative approach goes beyond just medical intervention. These specialists also work together to create a supportive, child-friendly environment that reduces anxiety and promotes positive dental experiences. They share insights about a child's unique needs, medical history, and potential challenges to ensure a tailored, compassionate approach to treatment.

By breaking down traditional professional silos and embracing a team-oriented mindset, healthcare providers can deliver truly comprehensive dental care that supports children's overall health and well-being. This approach not only improves immediate treatment outcomes but also helps children develop lifelong positive attitudes toward dental health.

Ethical and Professional Standards: Responsibilities of Healthcare Providers in Treatment

Healthcare providers carry an immense responsibility that extends far beyond medical technical skills. Their professional obligations encompass a complex web of ethical considerations that demand both compassion and integrity.

At the core of these responsibilities is the fundamental principle of patient autonomy. Providers must respect each patient's right to make informed decisions about their own healthcare, which means thoroughly explaining treatment options, potential risks, and expected outcomes. This communication should be clear, honest, and delivered in a manner that empowers patients to understand their medical choices.

Confidentiality represents another critical ethical standard. Healthcare professionals are entrusted with deeply personal medical information and must protect patient privacy rigorously. This means maintaining strict protocols about sharing medical records and discussing patient details only with authorized individuals.

Equally important is the commitment to non-discrimination. Regardless of a patient's background, socioeconomic status, gender, race, or personal beliefs, healthcare providers must deliver equitable, high-quality care. Every individual deserves respectful and comprehensive medical treatment.

Competence and continuous learning are also essential professional responsibilities. Medical knowledge evolves rapidly, so providers must stay updated with the latest research, techniques, and best practices. This commitment ensures patients receive the most current and effective treatments available.

Ultimately, these ethical standards aren't just bureaucratic guidelines-they represent a profound moral commitment to human dignity and well-being. By adhering to these principles, healthcare providers transform medical treatment from a purely technical interaction into a deeply human experience of care and compassion.

Healthcare providers play a crucial role in delivering safe, ethical, and high-quality medical care, and this responsibility is particularly evident in maintaining professional standards and patient safety. At the core of their practice, healthcare professionals must consistently uphold rigorous ethical and clinical guidelines that protect patients and ensure the highest level of care.

Maintaining high professional standards means more than just technical competence. It involves a holistic approach to patient treatment that encompasses continuous learning, self-reflection, and a commitment to excellence. Physicians and healthcare workers must stay updated with the latest medical research, attend professional development workshops, and regularly evaluate their own practices to ensure they are providing the most current and effective treatments.

Patient safety is paramount in healthcare. This goes beyond simply avoiding medical errors; it involves creating a comprehensive environment of care that minimizes risks and prioritizes patient well-being. Healthcare providers must implement robust safety protocols, communicate clearly with patients, and create systems that prevent potential mistakes.

Obtaining informed consent is a critical ethical requirement that respects patient autonomy. This process involves thoroughly explaining medical procedures, potential risks, alternative treatments, and expected outcomes. Patients must fully understand what they are agreeing to, ensuring they can make truly informed decisions about their healthcare.

Adhering to recognized guidelines and best practices provides a standardized framework for delivering consistent, evidence-based care. These guidelines, developed by professional medical associations, represent the collective wisdom of experts and serve as a benchmark for quality treatment across different healthcare settings.

By embracing these principles, healthcare providers demonstrate their commitment to professionalism, patient rights, and the fundamental goal of medical practice: promoting health and healing with compassion, skill, and integrity.

#### **About orthodontics**

Orthodontics



Connecting the arch-wire on brackets with wire

Occupation	
Names	Orthodontist
Occupation type	Specialty
Activity sectors	Dentistry
Description	
Education required	Dental degree, specialty training
Fields of employment	Private practices, hospitals

**Orthodontics**[<sup>a</sup>][<sup>b</sup>] is a dentistry specialty that addresses the diagnosis, prevention, management, and correction of mal-positioned teeth and jaws, as well as misaligned bite patterns.[<sup>2</sup>] It may also address the modification of facial growth, known as **dentofacial orthopedics**.

Abnormal alignment of the teeth and jaws is very common. The approximate worldwide prevalence of malocclusion was as high as 56%.[<sup>3</sup>] However, conclusive scientific evidence for the health benefits of orthodontic treatment is lacking, although patients with completed treatment have reported a higher quality of life than that of untreated patients undergoing orthodontic treatment.[<sup>4</sup>][<sup>5</sup>] The main reason for the prevalence of these malocclusions is diets with less fresh fruit and vegetables and overall softer foods in childhood, causing smaller jaws with less room for the teeth to erupt.[<sup>6</sup>] Treatment may require several months to a few years and entails using dental braces and other appliances to gradually adjust tooth position and jaw alignment. In cases where the malocclusion is severe, jaw surgery may be incorporated into the treatment plan. Treatment usually begins before a person reaches adulthood, insofar as pre-adult bones may be adjusted more easily before adulthood.

## History

Though it was rare until the Industrial Revolution,[<sup>7</sup>] there is evidence of the issue of overcrowded, irregular, and protruding teeth afflicting individuals. Evidence from Greek and Etruscan materials suggests that attempts to treat this disorder date back to 1000 BC, showcasing primitive yet impressively well-crafted orthodontic appliances. In the 18th and 19th centuries, a range of devices for the "regulation" of teeth were described by various dentistry authors who occasionally put them into practice.[<sup>8</sup>] As a modern science, orthodontics dates back to the mid-1800s.[<sup>9</sup>] The field's influential contributors include Norman William Kingsley[<sup>9</sup>] (1829–1913) and Edward Angle[<sup>10</sup>] (1855–1930). Angle created the first basic system for classifying malocclusions, a system that remains in use today.[<sup>9</sup>]

Beginning in the mid-1800s, Norman Kingsley published *Oral Deformities*, which is now credited as one of the first works to begin systematically documenting orthodontics. Being a major presence in American dentistry during the latter half of the 19th century, not only was Kingsley one of the early users of extraoral force to correct protruding teeth, but he was also one of the pioneers for treating cleft palates and associated issues. During the era of orthodontics under Kingsley and his colleagues, the treatment was focused on straightening teeth and creating facial harmony. Ignoring occlusal relationships, it was typical to remove teeth for a variety of dental issues, such as malalignment or overcrowding. The concept of an intact dentition was not widely appreciated in those days, making bite correlations seem irrelevant.[<sup>8</sup>]

In the late 1800s, the concept of occlusion was essential for creating reliable prosthetic replacement teeth. This idea was further refined and ultimately applied in various ways when dealing with healthy dental structures as well. As these concepts of prosthetic occlusion progressed, it became an invaluable tool for dentistry.[<sup>8</sup>]

It was in 1890 that the work and impact of Dr. Edwards H. Angle began to be felt, with his contribution to modern orthodontics particularly noteworthy. Initially focused on prosthodontics, he taught in Pennsylvania and Minnesota before directing his attention towards dental occlusion and the treatments needed to maintain it as a normal condition, thus becoming known as the "father of modern orthodontics".[<sup>8</sup>]

By the beginning of the 20th century, orthodontics had become more than just the straightening of crooked teeth. The concept of ideal occlusion, as postulated by Angle and incorporated into a classification system, enabled a shift towards treating malocclusion, which is any deviation from normal occlusion.<sup>[8]</sup> Having a full set of teeth on both arches was highly sought after in orthodontic treatment due to the need for exact relationships between them. Extraction as an orthodontic procedure was heavily opposed by Angle and those who followed him. As occlusion became the key priority, facial proportions and aesthetics were neglected. To achieve ideal occlusals without using external forces, Angle postulated that having perfect occlusion was the best way to gain optimum facial aesthetics.<sup>[8]</sup>

With the passing of time, it became quite evident that even an exceptional occlusion was not suitable when considered from an aesthetic point of view. Not only were there issues related to aesthetics, but it usually proved impossible to keep a precise occlusal relationship achieved by forcing teeth together over extended durations with the use of robust elastics, something Angle and his students had previously suggested. Charles Tweed[<sup>11</sup>] in America and Raymond Begg[<sup>12</sup>] in Australia (who both studied under Angle) re-introduced dentistry extraction into orthodontics during the 1940s and 1950s so they could improve facial esthetics while also ensuring better stability concerning occlusal relationships.[<sup>13</sup>]

In the postwar period, cephalometric radiography[<sup>14</sup>] started to be used by orthodontists for measuring changes in tooth and jaw position caused by growth and treatment.[<sup>15</sup>] The x-rays showed that many Class II and III malocclusions were due to improper jaw relations as opposed to misaligned teeth. It became evident that orthodontic therapy could adjust mandibular development, leading to the formation of functional jaw orthopedics in Europe and extraoral force measures in the US. These days, both functional appliances and extraoral devices are applied around the globe with the aim of amending growth patterns and forms. Consequently, pursuing true, or at least improved, jaw relationships had become the main objective of treatment by the mid-20th century.[<sup>8</sup>]

At the beginning of the twentieth century, orthodontics was in need of an upgrade. The American Journal of Orthodontics was created for this purpose in 1915; before it, there were no scientific objectives to follow, nor any precise classification system and brackets that lacked features.[<sup>16</sup>]

Until the mid-1970s, braces were made by wrapping metal around each tooth.<sup>[9]</sup> With advancements in adhesives, it became possible to instead bond metal brackets to the teeth.<sup>[9]</sup>

In 1972, Lawrence F. Andrews gave an insightful definition of the ideal occlusion in permanent teeth. This has had meaningful effects on orthodontic treatments that are administered regularly,[<sup>16</sup>] and these are: 1. Correct interarchal relationships 2. Correct crown angulation (tip) 3. Correct crown inclination (torque) 4. No rotations 5. Tight contact points 6. Flat Curve of Spee (0.0–2.5 mm),[<sup>17</sup>] and based on these principles, he discovered a treatment system called the straight-wire appliance system, or the pre-adjusted edgewise system. Introduced in 1976, Larry Andrews' pre-adjusted edgewise appliance, more commonly known as the straight wire appliance, has since revolutionized fixed orthodontic treatment. The advantage of the design lies in its bracket and archwire combination, which requires only minimal wire bending from the orthodontist or clinician. It's aptly named after this feature: the angle of the slot and thickness of the bracket base ultimately determine where each tooth is situated with little need for extra manipulation.[<sup>18</sup>][<sup>19</sup>][<sup>20</sup>]

Prior to the invention of a straight wire appliance, orthodontists were utilizing a nonprogrammed standard edgewise fixed appliance system, or Begg's pin and tube system. Both of these systems employed identical brackets for each tooth and necessitated the bending of an archwire in three planes for locating teeth in their desired positions, with these bends dictating ultimate placements.<sup>[18]</sup>

### Evolution of the current orthodontic appliances

[edit]

When it comes to orthodontic appliances, they are divided into two types: removable and fixed. Removable appliances can be taken on and off by the patient as required. On the other hand, fixed appliances cannot be taken off as they remain bonded to the teeth during treatment.

### **Fixed appliances**

[edit]

Fixed orthodontic appliances are predominantly derived from the edgewise appliance approach, which typically begins with round wires before transitioning to rectangular archwires for improving tooth alignment. These rectangluar wires promote precision in the positioning of teeth following initial treatment. In contrast to the Begg appliance, which was based solely on round wires and auxiliary springs, the Tip-Edge system emerged in the early 21st century. This innovative technology allowed for the utilization of rectangular archwires to precisely control tooth movement during the finishing stages after initial treatment with round wires. Thus, almost all modern fixed appliances can be considered variations on this edgewise appliance system.

Early 20th-century orthodontist Edward Angle made a major contribution to the world of dentistry. He created four distinct appliance systems that have been used as the basis for many orthodontic treatments today, barring a few exceptions. They are E-arch, pin and tube, ribbon arch, and edgewise systems.

#### E-arch

#### [edit]

Edward H. Angle made a significant contribution to the dental field when he released the 7th edition of his book in 1907, which outlined his theories and detailed his technique. This approach was founded upon the iconic "E-Arch" or 'the-arch' shape as well as intermaxillary elastics.[<sup>21</sup>] This device was different from any other appliance of its period as it featured a rigid framework to which teeth could be tied effectively in order to recreate an arch form that followed pre-defined dimensions.[<sup>22</sup>] Molars were fitted with braces, and a powerful labial archwire was positioned around the arch. The wire ended in a thread, and

to move it forward, an adjustable nut was used, which allowed for an increase in circumference. By ligation, each individual tooth was attached to this expansive archwire.[<sup>8</sup>]

### Pin and tube appliance

[edit]

Due to its limited range of motion, Angle was unable to achieve precise tooth positioning with an E-arch. In order to bypass this issue, he started using bands on other teeth combined with a vertical tube for each individual tooth. These tubes held a soldered pin, which could be repositioned at each appointment in order to move them in place.<sup>[8]</sup> Dubbed the "bone-growing appliance", this contraption was theorized to encourage healthier bone growth due to its potential for transferring force directly to the roots.<sup>[23]</sup> However, implementing it proved troublesome in reality.

#### **Ribbon arch**

[edit]

Realizing that the pin and tube appliance was not easy to control, Angle developed a better option, the ribbon arch, which was much simpler to use. Most of its components were already prepared by the manufacturer, so it was significantly easier to manage than before. In order to attach the ribbon arch, the occlusal area of the bracket was opened. Brackets were only added to eight incisors and mandibular canines, as it would be impossible to insert the arch into both horizontal molar tubes and the vertical brackets of adjacent premolars. This lack of understanding posed a considerable challenge to dental professionals; they were unable to make corrections to an excessive Spee curve in bicuspid teeth.[<sup>24</sup>] Despite the complexity of the situation, it was necessary for practitioners to find a resolution. Unparalleled to its counterparts, what made the ribbon arch instantly popular was that its archwire had remarkable spring qualities and could be utilized to accurately align teeth that were misaligned. However, a major drawback of this device was its inability to effectively control root position since it did not have enough resilience to generate the torque movements required for setting roots in their new place.[<sup>8</sup>]

#### **Edgewise appliance**

In an effort to rectify the issues with the ribbon arch, Angle shifted the orientation of its slot from vertical, instead making it horizontal. In addition, he swapped out the wire and replaced it with a precious metal wire that was rotated by 90 degrees in relation—henceforth known as Edgewise.<sup>[25]</sup> Following extensive trials, it was concluded that dimensions of 22 × 28 mils were optimal for obtaining excellent control over crown and root positioning across all three planes of space.<sup>[26]</sup> After debuting in 1928, this appliance quickly became one of the mainstays for multibanded fixed therapy, although ribbon arches continued to be utilized for another decade or so beyond this point too.<sup>[8]</sup>

## Labiolingual

[edit]

Prior to Angle, the idea of fitting attachments on individual teeth had not been thought of, and in his lifetime, his concern for precisely positioning each tooth was not highly appraised. In addition to using fingersprings for repositioning teeth with a range of removable devices, two main appliance systems were very popular in the early part of the 20th century. Labiolingual appliances use bands on the first molars joined with heavy lingual and labial archwires affixed with soldered fingersprings to shift single teeth.

#### Twin wire

[edit]

Utilizing bands around both incisors and molars, a twin-wire appliance was designed to provide alignment between these teeth. Constructed with two 10-mil steel archwires, its delicate features were safeguarded by lengthy tubes stretching from molars towards canines. Despite its efforts, it had limited capacity for movement without further modifications, rendering it obsolete in modern orthodontic practice.

## **Begg's Appliance**

[edit]

Returning to Australia in the 1920s, the renowned orthodontist, Raymond Begg, applied his knowledge of ribbon arch appliances, which he had learned from the Angle School. On top of this, Begg recognized that extracting teeth was sometimes vital for successful outcomes and sought to modify the ribbon arch appliance to provide more control when dealing with root positioning. In the late 1930s, Begg developed his adaptation of the appliance, which took three forms. Firstly, a high-strength 16-mil round stainless steel wire replaced the original precious metal ribbon arch. Secondly, he kept the same ribbon arch bracket but inverted it so that it pointed toward the gums instead of away from them.

Lastly, auxiliary springs were added to control root movement. This resulted in what would come to be known as the Begg Appliance. With this design, friction was decreased since contact between wire and bracket was minimal, and binding was minimized due to tipping and uprighting being used for anchorage control, which lessened contact angles between wires and corners of the bracket.

## **Tip-Edge System**

[edit]

Begg's influence is still seen in modern appliances, such as Tip-Edge brackets. This type of bracket incorporates a rectangular slot cutaway on one side to allow for crown tipping with no incisal deflection of an archwire, allowing teeth to be tipped during space closure and then uprighted through auxiliary springs or even a rectangular wire for torque purposes in finishing. At the initial stages of treatment, small-diameter steel archwires should be used when working with Tip-Edge brackets.

## Contemporary edgewise systems

[edit]

Throughout time, there has been a shift in which appliances are favored by dentists. In particular, during the 1960s, when it was introduced, the Begg appliance gained wide popularity due to its efficiency compared to edgewise appliances of that era; it could produce the same results with less investment on the dentist's part. Nevertheless, since then, there have been advances in technology and sophistication in edgewise appliances, which led to the opposite conclusion: nowadays, edgewise appliances are more efficient than the Begg appliance, thus explaining why it is commonly used.

## Automatic rotational control

[edit]

At the beginning, Angle attached eyelets to the edges of archwires so that they could be held with ligatures and help manage rotations. Now, however, no extra ligature is needed due to either twin brackets or single brackets that have added wings touching underneath the wire (Lewis or Lang brackets). Both types of brackets simplify the process of obtaining moments that control movements along a particular plane of space.

## Alteration in bracket slot dimensions

In modern dentistry, two types of edgewise appliances exist: the 18- and 22-slot varieties. While these appliances are used differently, the introduction of a 20-slot device with more precise features has been considered but not pursued yet.<sup>27</sup>]

### Straight-wire bracket prescriptions

[edit]

Rather than rely on the same bracket for all teeth, L.F. Andrews found a way to make different brackets for each tooth in the 1980s, thanks to the increased convenience of bonding.[<sup>28</sup>] This adjustment enabled him to avoid having multiple bends in archwires that would have been needed to make up for variations in tooth anatomy. Ultimately, this led to what was termed a "straight-wire appliance" system – an edgewise appliance that greatly enhanced its efficiency.[<sup>29</sup>] The modern edgewise appliance has slightly different construction than the original one. Instead of relying on faciolingual bends to accommodate variations among teeth, each bracket has a correspondingly varying base thickness depending on the tooth it is intended for. However, due to individual differences between teeth, this does not completely eliminate the need for compensating bends.[<sup>30</sup>] Accurately placing the roots of many teeth requires angling brackets in relation to the long axis of the tooth. Traditionally, this mesiodistal root positioning necessitated using second-order, or tip, bends along the archwire. However, angling the bracket or bracket slot eliminates this need for bends.

Given the discrepancies in inclination of facial surfaces across individual teeth, placing a twist, otherwise known as third-order or torque bends, into segments of each rectangular archwire was initially required with the edgewise appliance. These bends were necessary for all patients and wires, not just to avoid any unintentional movement of suitably placed teeth or when moving roots facially or lingually. Angulation of either brackets or slots can minimize the need for second-order or tip bends on archwires. Contemporary edgewise appliances come with brackets designed to adjust for any facial inclinations, thereby eliminating or reducing any third-order bends. These brackets already have angulation and torque values built in so that each rectangluar archwire can be contorted to form a custom fit without inadvertently shifting any correctly positioned teeth. Without bracket angulation and torque, second-order or tip bends would still be required on each patient's archwire.

#### Methods



Upper and lower jaw functional expanders

A typical treatment for incorrectly positioned teeth (malocclusion) takes from one to two years, with braces being adjusted every four to 10 weeks by orthodontists,[<sup>31</sup>] while university-trained dental specialists are versed in the prevention, diagnosis, and treatment of dental and facial irregularities. Orthodontists offer a wide range of treatment options to straighten crooked teeth, fix irregular bites, and align the jaws correctly.[<sup>32</sup>] There are many ways to adjust malocclusion. In growing patients, there are more options to treat skeletal discrepancies, either by promoting or restricting growth using functional appliances, orthodontic headgear, or a reverse pull facemask. Most orthodontic work begins in the early permanent dentition stage before skeletal growth is completed. If skeletal growth has completed, jaw surgery is an option. Sometimes teeth are extracted to aid the orthodontic treatment (teeth are extracted in about half of all the cases, most commonly the premolars).[<sup>33</sup>]

Orthodontic therapy may include the use of fixed or removable appliances. Most orthodontic therapy is delivered using appliances that are fixed in place,[<sup>34</sup>] for example, braces that are adhesively bonded to the teeth. Fixed appliances may provide greater mechanical control of the teeth; optimal treatment outcomes are improved by using fixed appliances.

Fixed appliances may be used, for example, to rotate teeth if they do not fit the arch shape of the other teeth in the mouth, to adjust multiple teeth to different places, to change the tooth angle of teeth, or to change the position of a tooth's root. This treatment course is not preferred where a patient has poor oral hygiene, as decalcification, tooth decay, or other complications may result. If a patient is unmotivated (insofar as treatment takes several months and requires commitment to oral hygiene), or if malocclusions are mild.

The biology of tooth movement and how advances in gene therapy and molecular biology technology may shape the future of orthodontic treatment.[<sup>35</sup>]

#### Braces



Braces are usually placed on the front side of the teeth, but they may also be placed on the side facing the tongue (called lingual braces). Brackets made out of stainless steel or porcelain are bonded to the center of the teeth using an adhesive. Wires are placed in a slot in the brackets, which allows for controlled movement in all three dimensions.

Apart from wires, forces can be applied using elastic bands,[<sup>36</sup>] and springs may be used to push teeth apart or to close a gap. Several teeth may be tied together with ligatures, and different kinds of hooks can be placed to allow for connecting an elastic band.[<sup>37</sup>][<sup>36</sup>]

Clear aligners are an alternative to braces, but insufficient evidence exists to determine their effectiveness.[ $^{38}$ ]

### **Treatment duration**

[edit]

The time required for braces varies from person to person as it depends on the severity of the problem, the amount of room available, the distance the teeth must travel, the health of the teeth, gums, and supporting bone, and how closely the patient follows instructions. On average, however, once the braces are put on, they usually remain in place for one to three years. After braces are removed, most patients will need to wear a retainer all the time for the first six months, then only during sleep for many years.[<sup>39</sup>]

#### Headgear

[edit]

Orthodontic headgear, sometimes referred to as an "extra-oral appliance", is a treatment approach that requires the patient to have a device strapped onto their head to help correct malocclusion—typically used when the teeth do not align properly. Headgear is most often used along with braces or other orthodontic appliances. While braces correct the position of teeth, orthodontic headgear—which, as the name suggests, is worn on or strapped onto the patient's head—is most often added to orthodontic treatment to help alter the alignment of the jaw, although there are some situations in which such an appliance can help move teeth, particularly molars.



Full orthodontic headgear with headcap, fitting straps, facebow, and elastics

Whatever the purpose, orthodontic headgear works by exerting tension on the braces via hooks, a facebow, coils, elastic bands, metal orthodontic bands, and other attachable appliances directly into the patient's mouth. It is most effective for children and teenagers because their jaws are still developing and can be easily manipulated. (If an adult is fitted with headgear, it is usually to help correct the position of teeth that have shifted after other teeth have been extracted.) Thus, headgear is typically used to treat a number of jaw alignment or bite problems, such as overbite and underbite.[<sup>40</sup>]

## **Palatal expansion**

[edit]

Palatal expansion can be best achieved using a fixed tissue-borne appliance. Removable appliances can push teeth outward but are less effective at maxillary sutural expansion. The effects of a removable expander may look the same as they push teeth outward, but they should not be confused with actually expanding the palate. Proper palate expansion can create more space for teeth as well as improve both oral and nasal airflow.<sup>41</sup>

#### Jaw surgery

[edit]

Jaw surgery may be required to fix severe malocclusions.[<sup>42</sup>] The bone is broken during surgery and stabilized with titanium (or bioresorbable) plates and screws to allow for healing to take place.[<sup>43</sup>] After surgery, regular orthodontic treatment is used to move the

## **During treatment**

[edit]

To reduce pain during the orthodontic treatment, low-level laser therapy (LLLT), vibratory devices, chewing adjuncts, brainwave music, or cognitive behavioral therapy can be used. However, the supporting evidence is of low quality, and the results are inconclusive.[<sup>45</sup>]

#### Post treatment

[edit]

After orthodontic treatment has been completed, there is a tendency for teeth to return, or relapse, back to their pre-treatment positions. Over 50% of patients have some reversion to pre-treatment positions within 10 years following treatment.[<sup>46</sup>] To prevent relapse, the majority of patients will be offered a retainer once treatment has been completed and will benefit from wearing their retainers. Retainers can be either fixed or removable.

#### **Removable retainers**

[edit]

Removable retainers are made from clear plastic, and they are custom-fitted for the patient's mouth. It has a tight fit and holds all of the teeth in position. There are many types of brands for clear retainers, including Zendura Retainer, Essix Retainer, and Vivera Retainer.<sup>[47]</sup> A Hawley retainer is also a removable orthodontic appliance made from a combination of plastic and metal that is custom-molded to fit the patient's mouth. Removable retainers will be worn for different periods of time, depending on the patient's need to stabilize the dentition.<sup>[48]</sup>

#### **Fixed retainers**

[edit]

Fixed retainers are a simple wire fixed to the tongue-facing part of the incisors using dental adhesive and can be specifically useful to prevent rotation in incisors. Other types of fixed retainers can include labial or lingual braces, with brackets fixed to the teeth.<sup>[48]</sup>

## Palatal expander

0

Image not found or type unknown

### Palatal expander Orthodontic headgear

0

Image not found or type unknown

#### Orthodontic headgear An X-ray taken for skull analysis

0

Image not found or type unknown

An X-ray taken for skull analysis

0

Image not found or type unknown

Top (left) and bottom retainers

#### **Clear aligners**

[edit]

Clear aligners are another form of orthodontics commonly used today, involving removable plastic trays. There has been controversy about the effectiveness of aligners such as Invisalign or Byte; some consider them to be faster and more freeing than the alternatives.[<sup>49</sup>]

## Training

[edit]

There are several specialty areas in dentistry, but the specialty of orthodontics was the first to be recognized within dentistry.[<sup>50</sup>] Specifically, the American Dental Association recognized orthodontics as a specialty in the 1950s.[<sup>50</sup>] Each country has its own system for training and registering orthodontic specialists.

#### Australia

[edit]

In Australia, to obtain an accredited three-year full-time university degree in orthodontics, one will need to be a qualified dentist (complete an AHPRA-registered general dental degree) with a minimum of two years of clinical experience. There are several universities in Australia that offer orthodontic programs: the University of Adelaide, the University of Melbourne, the University of Sydney, the University of Queensland, the University of Western Australia, and the University of Otago.[<sup>51</sup>] Orthodontic courses are accredited by the Australian Dental Council and reviewed by the Australian Society of Orthodontists (ASO). Prospective applicants should obtain information from the relevant institution before applying for admission.[<sup>52</sup>] After completing a degree in orthodontics, specialists

are required to be registered with the Australian Health Practitioner Regulation Agency (AHPRA) in order to practice.[ $^{53}$ ][ $^{54}$ ]

## Bangladesh

[edit]

Dhaka Dental College in Bangladesh is one of the many schools recognized by the Bangladesh Medical and Dental Council (BM&DC) that offer post-graduation orthodontic courses.<sup>[55]</sup>[<sup>56</sup>] Before applying to any post-graduation training courses, an applicant must have completed the Bachelor of Dental Surgery (BDS) examination from any dental college.[<sup>55</sup>] After application, the applicant must take an admissions test held by the specific college.[<sup>55</sup>] If successful, selected candidates undergo training for six months.[<sup>57</sup>]

## Canada

[edit]

In Canada, obtaining a dental degree, such as a Doctor of Dental Surgery (DDS) or Doctor of Medical Dentistry (DMD), would be required before being accepted by a school for orthodontic training.<sup>[58]</sup> Currently, there are 10 schools in the country offering the orthodontic specialty.<sup>[58]</sup> Candidates should contact the individual school directly to obtain the most recent pre-requisites before entry.<sup>[58]</sup> The Canadian Dental Association expects orthodontists to complete at least two years of post-doctoral, specialty training in orthodontics in an accredited program after graduating from their dental degree.

## **United States**

[edit]

Similar to Canada, there are several colleges and universities in the United States that offer orthodontic programs. Every school has a different enrollment process, but every applicant is required to have graduated with a DDS or DMD from an accredited dental school.<sup>[59</sup>][<sup>60</sup>] Entrance into an accredited orthodontics program is extremely competitive and begins by passing a national or state licensing exam.<sup>[61</sup>]

The program generally lasts for two to three years, and by the final year, graduates are required to complete the written American Board of Orthodontics (ABO) exam.[<sup>61</sup>] This exam is also broken down into two components: a written exam and a clinical exam.[<sup>61</sup>] The written exam is a comprehensive exam that tests for the applicant's knowledge of basic sciences and clinical concepts.[<sup>61</sup>] The clinical exam, however, consists of a Board Case Oral Examination (BCOE), a Case Report Examination (CRE), and a Case Report

Oral Examination (CROE).<sup>[61</sup>] Once certified, certification must then be renewed every ten years.<sup>[61</sup>] Orthodontic programs can award a Master of Science degree, a Doctor of Science degree, or a Doctor of Philosophy degree, depending on the school and individual research requirements.<sup>[62</sup>]

## **United Kingdom**

[edit]

This section **relies largely or entirely on a single source**. Relevant discussion may be found on the talk page. Please help improve this article by introducing citations to additional sources.



Find sources: "Orthodontics" – news • newspapers • books • scholar • JSTOR ( May 2023)

Throughout the United Kingdom, there are several Orthodontic Specialty Training Registrar posts available.[<sup>63</sup>] The program is full-time for three years, and upon completion, trainees graduate with a degree at the Masters or Doctorate level.[<sup>63</sup>] Training may take place within hospital departments that are linked to recognized dental schools.[<sup>63</sup>] Obtaining a Certificate of Completion of Specialty Training (CCST) allows an orthodontic specialist to be registered under the General Dental Council (GDC).[<sup>63</sup>] An orthodontic specialist can provide care within a primary care setting, but to work at a hospital as an orthodontic consultant, higher-level training is further required as a post-CCST trainee.[<sup>63</sup>] To work within a university setting as an academic consultant, completing research toward obtaining a Ph.D. is also required.[<sup>63</sup>]

#### See also

[edit]

- Orthodontic technology
- Orthodontic indices
- List of orthodontic functional appliances
- Molar distalization
- Mouth breathing
- Obligate nasal breathing

## Notes

## [edit]

- 1. Also referred to as orthodontia
- 2. ^ "Orthodontics" comes from the Greek *orthos* ('correct, straight') and *-odont-* ('tooth').[<sup>1</sup>]

## References

- 1. **^** "Definition of orthodontics | Dictionary.com". www.dictionary.com. Retrieved 2019-08-28.
- 2. **^** "What is orthodontics?// Useful Resources: FAQ and Downloadable eBooks". Orthodontics Australia. Retrieved 2020-08-13.
- A Lombardo G, Vena F, Negri P, Pagano S, Barilotti C, Paglia L, Colombo S, Orso M, Cianetti S (June 2020). "Worldwide prevalence of malocclusion in the different stages of dentition: A systematic review and meta-analysis". Eur J Paediatr Dent. 21 (2): 115–22. doi:10.23804/ejpd.2020.21.02.05. PMID 32567942.
- 4. **^** Whitcomb I (2020-07-20). "Evidence and Orthodontics: Does Your Child Really Need Braces?". Undark Magazine. Retrieved 2020-07-27.
- Controversial report finds no proof that dental braces work". British Dental Journal . 226 (2): 91. 2019-01-01. doi:10.1038/sj.bdj.2019.65. ISSN 1476-5373. S2CID 59222957.
- Von Cramon-Taubadel N (December 2011). "Global human mandibular variation reflects differences in agricultural and hunter-gatherer subsistence strategies". Proceedings of the National Academy of Sciences of the United States of America. **108** (49): 19546–19551. Bibcode:2011PNAS..10819546V. doi: 10.1073/pnas.1113050108. PMC 3241821. PMID 22106280.
- <sup>A</sup> Rose, Jerome C.; Roblee, Richard D. (June 2009). "Origins of dental crowding and malocclusions: an anthropological perspective". Compendium of Continuing Education in Dentistry (Jamesburg, N.J.: 1995). **30** (5): 292–300. ISSN 1548-8578. PMID 19514263.
- A *a b c d e f g h i j k* Proffit WR, Fields Jr HW, Larson BE, Sarver DM (2019). Contemporary orthodontics (Sixth ed.). Philadelphia, PA. ISBN 978-0-323-54387-3. OCLC 1089435881.cite book: CS1 maint: location missing publisher (link)
- 9. ^ *a b c d e* "A Brief History of Orthodontic Braces ArchWired". www.archwired.com . 17 July 2019.<sup>[</sup>self-published source<sup>]</sup>
- Peck S (November 2009). "A biographical portrait of Edward Hartley Angle, the first specialist in orthodontics, part 1". The Angle Orthodontist. **79** (6): 1021–1027. doi:10.2319/021009-93.1. PMID 19852589.
- 11. **^** "The Application of the Principles of the Edge- wise Arch in the Treatment of Malocclusions: II.\*". meridian.allenpress.com. Retrieved 2023-02-07.
- 12. **^** "British Orthodontic Society > Museum and Archive > Collection > Fixed Appliances > Begg". www.bos.org.uk. Retrieved 2023-02-07.
- 13. <sup>A</sup> Safirstein D (August 2015). "P. Raymond Begg". American Journal of Orthodontics and Dentofacial Orthopedics. **148** (2): 206. doi:10.1016/j.ajodo.2015.06.005. PMID 26232825.
- <sup>A</sup> Higley LB (August 1940). "Lateral head roentgenograms and their relation to the orthodontic problem". American Journal of Orthodontics and Oral Surgery. 26 (8): 768–778. doi:10.1016/S0096-6347(40)90331-3. ISSN 0096-6347.
- 15. **^** Themes UF (2015-01-12). "14: Cephalometric radiography". Pocket Dentistry. Retrieved 2023-02-07.
- A *a b* Andrews LF (December 2015). "The 6-elements orthodontic philosophy: Treatment goals, classification, and rules for treating". American Journal of Orthodontics and Dentofacial Orthopedics. **148** (6): 883–887. doi:
10.1016/j.ajodo.2015.09.011. PMID 26672688.

- 17. Andrews LF (September 1972). "The six keys to normal occlusion". American Journal of Orthodontics. **62** (3): 296–309. doi:10.1016/s0002-9416(72)90268-0. PMID 4505873. S2CID 8039883.
- 18. ^ *a b* Themes UF (2015-01-01). "31 The straight wire appliance". Pocket Dentistry. Retrieved 2023-02-07.
- Andrews LF (July 1979). "The straight-wire appliance". British Journal of Orthodontics. 6 (3): 125–143. doi:10.1179/bjo.6.3.125. PMID 297458. S2CID 33259729.
- Phulari B (2013), "Andrews' Straight Wire Appliance", History of Orthodontics, Jaypee Brothers Medical Publishers (P) Ltd., p. 98, doi:10.5005/jp/books/12065\_11, ISBN 9789350904718, retrieved 2023-02-07
- 21. Angle EH. Treatment of malocclusion of the teeth. 7th éd. Philadelphia: S.S.White Dental Mfg Cy, 1907
- Philippe J (March 2008). "How, why, and when was the edgewise appliance born?". Journal of Dentofacial Anomalies and Orthodontics. **11** (1): 68–74. doi: 10.1051/odfen/20084210113. ISSN 2110-5715.
- 23. ^ Angle EH (1912). "Evolution of orthodontia. Recent developments". Dental Cosmos. **54**: 853–867.
- 24. A Brodie AG (1931). "A discussion on the Newest Angle Mechanism". The Angle Orthodontist. 1: 32–38.
- 25. Angle EH (1928). "The latest and best in Orthodontic Mechanism". Dental Cosmos . **70**: 1143–1156.
- 26. **^** Brodie AG (1956). "Orthodontic Concepts Prior to the Death of Edward Angle". The Angle Orthodontist. **26**: 144–155.
- Matasa CG, Graber TM (April 2000). "Angle, the innovator, mechanical genius, and clinician". American Journal of Orthodontics and Dentofacial Orthopedics. **117** (4): 444–452. doi:10.1016/S0889-5406(00)70164-8. PMID 10756270.
- Andrews LF. Straight Wire: The Concept and Appliance. San Diego: LA Wells; 1989.
- 29. Andrews LF (1989). Straight wire: the concept and appliance. Lisa Schirmer. San Diego, CA. ISBN 978-0-9616256-0-3. OCLC 22808470.cite book: CS1 maint: location missing publisher (link)
- 30. **^** Roth RH (November 1976). "Five year clinical evaluation of the Andrews straightwire appliance". Journal of Clinical Orthodontics. **10** (11): 836–50. PMID 1069735.
- \* Fleming PS, Fedorowicz Z, Johal A, El-Angbawi A, Pandis N, et al. (The Cochrane Collaboration) (June 2015). "Surgical adjunctive procedures for accelerating orthodontic treatment". The Cochrane Database of Systematic Reviews. 2015 (6). John Wiley & Sons, Ltd.: CD010572. doi:10.1002/14651858.cd010572. PMC 6464946. PMID 26123284.
- 32. ^ "What is an Orthodontist?". Orthodontics Australia. 5 December 2019.
- A Dardengo C, Fernandes LQ, Capelli Júnior J (February 2016). "Frequency of orthodontic extraction". Dental Press Journal of Orthodontics. 21 (1): 54–59. doi:10.1590/2177-6709.21.1.054-059.oar. PMC 4816586. PMID 27007762.

- 34. **^** "Child Dental Health Survey 2013, England, Wales and Northern Ireland". digital.nhs.uk. Retrieved 2018-03-08.
- Atsawasuwan P, Shirazi S (2019-04-10). "Advances in Orthodontic Tooth Movement: Gene Therapy and Molecular Biology Aspect". In Aslan BI, Uzuner FD (eds.). Current Approaches in Orthodontics. IntechOpen. doi: 10.5772/intechopen.80287. ISBN 978-1-78985-181-6. Retrieved 2021-05-16.
- 36. ^ *a b* "Elastics For Braces: Rubber Bands in Orthodontics". Orthodontics Australia. 2019-12-15. Retrieved 2020-12-13.
- 37. ^ Mitchell L (2013). An Introduction to Orthodontics. Oxford Medical Publications. pp. 220–233.
- \* Rossini G, Parrini S, Castroflorio T, Deregibus A, Debernardi CL (September 2015). "Efficacy of clear aligners in controlling orthodontic tooth movement: a systematic review". The Angle Orthodontist. 85 (5): 881–889. doi:10.2319/061614-436.1. PMC 8610387. PMID 25412265. S2CID 10787375. "The quality level of the studies was not sufficient to draw any evidence-based conclusions."
- 39. ^ "Dental Braces and Retainers".
- Millett DT, Cunningham SJ, O'Brien KD, Benson PE, de Oliveira CM (February 2018). "Orthodontic treatment for deep bite and retroclined upper front teeth in children". The Cochrane Database of Systematic Reviews. 2 (2): CD005972. doi:10.1002/14651858.CD005972.pub4. PMC 6491166. PMID 29390172.
- 41. ^ "Palate Expander". Cleveland Clinic. Retrieved October 29, 2024.
- 42. **^** "Jaw Surgery". Modern Orthodontic Clinic in Sammamish & Bellevue. Retrieved 2024-10-03.
- Agnihotry A, Fedorowicz Z, Nasser M, Gill KS, et al. (The Cochrane Collaboration) (October 2017). Zbigniew F (ed.). "Resorbable versus titanium plates for orthognathic surgery". The Cochrane Database of Systematic Reviews. **10** (10). John Wiley & Sons, Ltd: CD006204. doi:10.1002/14651858.cd006204. PMC 6485457. PMID 28977689.
- 44. **^** "British Orthodontic Society > Public & Patients > Your Jaw Surgery". www.bos.org.uk. Retrieved 2019-08-28.
- \* Fleming PS, Strydom H, Katsaros C, MacDonald L, Curatolo M, Fudalej P, Pandis N, et al. (Cochrane Oral Health Group) (December 2016). "Non-pharmacological interventions for alleviating pain during orthodontic treatment". The Cochrane Database of Systematic Reviews. 2016 (12): CD010263. doi:10.1002/14651858.CD010263.pub2. PMC 6463902. PMID 28009052.
- Yu Y, Sun J, Lai W, Wu T, Koshy S, Shi Z (September 2013). "Interventions for managing relapse of the lower front teeth after orthodontic treatment". The Cochrane Database of Systematic Reviews. 2014 (9): CD008734. doi:10.1002/14651858.CD008734.pub2. PMC 10793711. PMID 24014170.
- 47. **^** "Clear Retainers | Maintain Your Hard to Get Smile with Clear Retainers". Retrieved 2020-01-13.
- A a b Martin C, Littlewood SJ, Millett DT, Doubleday B, Bearn D, Worthington HV, Limones A (May 2023). "Retention procedures for stabilising tooth position after treatment with orthodontic braces". The Cochrane Database of Systematic Reviews. 2023 (5): CD002283. doi:10.1002/14651858.CD002283.pub5. PMC 10202160.

PMID 37219527.

- Putrino A, Barbato E, Galluccio G (March 2021). "Clear Aligners: Between Evolution and Efficiency-A Scoping Review". International Journal of Environmental Research and Public Health. 18 (6): 2870. doi:10.3390/ijerph18062870. PMC 7998651. PMID 33799682.
- A *b* Christensen GJ (March 2002). "Orthodontics and the general practitioner". Journal of the American Dental Association. **133** (3): 369–371. doi:10.14219/jada.archive.2002.0178. PMID 11934193.
- 51. ^ "How to become an orthodontist". Orthodontics Australia. 26 September 2017.
- 52. ^ "Studying orthodontics". Australian Society of Orthodontists. 26 September 2017.
- 53. **^** "Specialties and Specialty Fields". Australian Health Practitioners Regulation Agency.
- 54. ^ "Medical Specialties and Specialty Fields". Medical Board of Australia.
- 55. **^ a b c** "Dhaka Dental College". Dhaka Dental College. Archived from the original on October 28, 2017. Retrieved October 28, 2017.
- 56. **^** "List of recognized medical and dental colleges". Bangladesh Medical & Dental Council (BM&DC). Retrieved October 28, 2017.
- 57. **^** "Orthodontic Facts Canadian Association of Orthodontists". Canadian Association of Orthodontists. Retrieved 26 October 2017.
- 58. ^ **a b c** "FAQ: I Want To Be An Orthodontist Canadian Association of Orthodontists". Canadian Association of Orthodontists. Retrieved 26 October 2017.
- 59. **^** "RCDC Eligibility". The Royal College of Dentists of Canada. Archived from the original on 29 October 2019. Retrieved 26 October 2017.
- 60. ^ "Accredited Orthodontic Programs AAO Members". www.aaoinfo.org.
- 61. ^ **a b c d e f** "About Board Certification". American Board of Orthodontists. Archived from the original on 16 February 2019. Retrieved 26 October 2017.
- 62. **^** "Accredited Orthodontic Programs | AAO Members". American Association of Orthodontists. Retrieved 26 October 2017.
- 63. ^ *a b c d e f* "Orthodontic Specialty Training in the UK" (PDF). British Orthodontic Society. Retrieved 28 October 2017.

hnage not found or type unknown

Look up *orthodontics* in Wiktionary, the free dictionary.



Wikimedia Commons has media related to Orthodontics.

- o v
- ∘ t
- **e**

Orthodontics

- Bolton analysis
- Cephalometric analysis
- Cephalometry
- Dentition analysis
- Failure of eruption of teeth

### Diagnosis

- Little's Irregularity Index
- Malocclusion
- Scissor bite
- Standard anatomical position
- Tooth ankylosis
- Tongue thrust
- Overbite
- Overjet
- Open bite
- Crossbite
- Dental crowding
- Dental spacing

#### Conditions

- Bimaxillary Protrusion • Prognathism
- Retrognathism
- Maxillary hypoplasia
- Condylar hyperplasia
- Overeruption
- Mouth breathing
- Temperomandibular dysfunction

- ACCO appliance
- $\circ$  Archwire
- Activator appliance
- Braces
- Damon system
- Elastics
- Frankel appliance
- Invisalign
- Lingual arch
- Lip bumper
- Herbst Appliance
- List of orthodontic functional appliances

# Appliances

- List of palatal expanders
- Lingual braces
- Headgear
- Orthodontic technology
- Orthodontic spacer
- Palatal lift prosthesis
- Palatal expander
- Quad helix
- Retainer
- SureSmile
- Self-ligating braces
- Splint activator
- Twin Block Appliance
- Anchorage (orthodontics)
- Cantilever mechanics
- $\circ$  Fiberotomy
- Procedures ° In

**Materials** 

- Interproximal reduction
- Intrusion (orthodontics)
  - Molar distalization
  - SARPE
  - Serial extraction
  - Beta-titanium
  - Nickel titanium
  - Stainless steel
  - TiMolium
  - Elgiloy
    - Ceramic
    - Composite
    - Dental elastics

- Edward Angle
- Spencer Atkinson
- Clifford Ballard
- Raymond Begg
- Hans Peter Bimler
- Samir Bishara
- Arne Björk
- Charles B. Bolton
- Holly Broadbent Sr.
- Allan G. Brodie
- Charles J. Burstone
- Peter Buschang
- Calvin Case
- Harold Chapman (Orthodontist)
- David Di Biase
- Jean Delaire
- Terry Dischinger
- William B. Downs
- John Nutting Farrar
- Rolf Frankel
- Sheldon Friel
- Thomas M. Graber
- Charles A. Hawley
- Reed Holdaway
- John Hooper (Orthodontist)
- Joseph Jarabak
- Harold Kesling
- Albert Ketcham
- $\circ$  Juri Kurol

Notable contributors

- Craven KurzBenno Lischer
- James A. McNamara
- Birte Melsen
- Robert Moyers
- Hayes Nance
- Ravindra Nanda
- George Northcroft
- Dean Harold Noyes
- Frederick Bogue Noyes
- Albin Oppenheim
- Herbert A. Pullen
- Earl W. Renfroe
- Robert M. Ricketts
- Alfred Paul Rogers
- Ronald Roth
- Everett Shapiro
- L. F. Andrews
- Frederick Lester Stanton
- Earl Emanuel Shepard

	<ul> <li>American Association of Orthodontists</li> <li>American Board of Orthodontics</li> <li>British Orthodontic Society</li> </ul>
Organizations	<ul> <li>Canadian Association of Orthodontists</li> </ul>
-	<ul> <li>Indian Orthodontic Society</li> </ul>
	<ul> <li>Italian Academy of Orthodontic Technology</li> </ul>
	<ul> <li>Society for Orthodontic Dental Technology (Germany)</li> </ul>
	• American Journal of Orthodontics and Dentofacial Orthopedics
Journals	<ul> <li>The Angle Orthodontist</li> </ul>
	<ul> <li>Journal of Orthodontics</li> </ul>
Institution	<ul> <li>Angle School of Orthodontia</li> </ul>
0 <b>V</b>	
-	

o t

• **e** 

Dentistry

- Endodontics
- Oral and maxillofacial pathology
- Oral and maxillofacial radiology
- Oral and maxillofacial surgery
- o Orthodontics and dentofacial orthopedics
- Pediatric dentistry
- Periodontics

• Prosthodontics

# **Specialties**

- Dental public health
- Cosmetic dentistry
- Dental implantology
- Geriatric dentistry
- Restorative dentistry
- Forensic odontology
- Dental traumatology
- Holistic dentistry
- Dental extraction
- Tooth filling
- Root canal therapy
- Root end surgery
- Scaling and root planing

#### **Dental surgery**

- Teeth cleaning
- Dental bonding
- Tooth polishing
- Tooth bleaching
- Socket preservation
- Dental implant

Organisations	<ul> <li>American Association of Orthodontists</li> <li>British Dental Association</li> <li>British Dental Health Foundation</li> <li>British Orthodontic Society</li> <li>Canadian Association of Orthodontists</li> <li>Dental Technologists Association</li> <li>General Dental Council</li> <li>Indian Dental Association</li> <li>National Health Service</li> </ul>
By country	<ul> <li>Canada</li> <li>Philippines</li> <li>Israel</li> <li>United Kingdom</li> <li>United States</li> <li>Index of oral health and dental articles</li> </ul>
See also	<ul> <li>Outline of dentistry and oral health</li> <li>Dental fear</li> <li>Dental instruments</li> <li>Dental material</li> <li>History of dental treatments <ul> <li>Ancient Rome</li> </ul> </li> <li>Infant oral mutilation</li> <li>Mouth assessment</li> <li>Oral hygiene</li> </ul>
• <b>V</b>	

- t
- υı
- **e**

Cleft lip and cleft palate

- Advance practice nursing
- Audiology
- Dentistry
- Dietetics
- Genetics
- Oral and maxillofacial surgery
- Orthodontics
- Orthodontic technology
- Otolaryngology
- Pediatrics
- Pediatric dentistry
- Physician
- Plastic surgery
- Psychiatry
- Psychology
- Respiratory therapy
- Social work
- Speech and language therapy
- Hearing loss with craniofacial syndromes
- Pierre Robin syndrome
- Popliteal pterygium syndrome
- Van der Woude syndrome
- Cleft Lip and Palate Association
- Craniofacial Society of Great Britain and Ireland
- Interplast
- North Thames Regional Cleft Lip and Palate Service
- Operation Smile
- Overseas Plastic Surgery Appeal
- Shriners Hospitals for Children
- Smile Train
- Transforming Faces Worldwide
- Smile Angel Foundation (China)
  - Germany
  - United States

# Authority control databases: National man national this at Wikidata

- Czech Republic
- $\circ$  Israel

Portal:

o ic Medicine or type unknown

**Related specialities** 

#### **Related syndromes**

# National and international organisations

mage not

This article **needs additional citations for verification**. Please help improve this article by adding citations to reliable sources. Unsourced material may be challenged and removed.

*Find sources:* "Dental braces" – news • newspapers • books • scholar • JSTOR ( *August 2016)* (*Learn how and when to remove this message*)



Dental braces

**Dental braces** (also known as **orthodontic braces**, or simply **braces**) are devices used in orthodontics that align and straighten teeth and help position them with regard to a person's bite, while also aiming to improve dental health. They are often used to correct underbites, as well as malocclusions, overbites, open bites, gaps, deep bites, cross bites, crooked teeth, and various other flaws of the teeth and jaw. Braces can be either cosmetic or structural. Dental braces are often used in conjunction with other orthodontic appliances to help widen the palate or jaws and to otherwise assist in shaping the teeth and jaws.

#### Process

#### [edit]

The application of braces moves the teeth as a result of force and pressure on the teeth. Traditionally, four basic elements are used: brackets, bonding material, arch wire, and ligature elastic (also called an "O-ring"). The teeth move when the arch wire puts pressure on the brackets and teeth. Sometimes springs or rubber bands are used to put more force in a specific direction.[<sup>1</sup>]

Braces apply constant pressure which, over time, moves teeth into the desired positions. The process loosens the tooth after which new bone grows to support the tooth in its new position. This is called bone remodelling. Bone remodelling is a biomechanical process responsible for making bones stronger in response to sustained load-bearing activity and weaker in the absence of carrying a load. Bones are made of cells called osteoclasts and osteoblasts. Two different kinds of bone resorption are possible: direct resorption, which starts from the lining cells of the alveolar bone, and indirect or retrograde resorption, which occurs when the periodontal ligament has been subjected to an excessive amount and duration of compressive stress.<sup>[2]</sup> Another important factor associated with tooth movement is bone deposition. Bone deposition occurs in the distracted periodontal ligament. Without bone deposition, the tooth will loosen, and voids will occur distal to the direction of tooth movement.<sup>[3]</sup>

# Types

[edit]



Upper and Lower Jaw Functional Expanders

- Traditional metal wired braces (also known as "train track braces") are stainlesssteel and are sometimes used in combination with titanium. Traditional metal braces are the most common type of braces.<sup>[4]</sup> These braces have a metal bracket with elastic ties (also known as rubber bands) holding the wire onto the metal brackets. The second-most common type of braces is self-ligating braces, which have a builtin system to secure the archwire to the brackets and do not require elastic ties. Instead, the wire goes through the bracket. Often with this type of braces, treatment time is reduced, there is less pain on the teeth, and fewer adjustments are required than with traditional braces.
- Gold-plated stainless steel braces are often employed for patients allergic to nickel (a basic and important component of stainless steel), but may also be chosen for aesthetic reasons.
- *Lingual* braces are a cosmetic alternative in which custom-made braces are bonded to the back of the teeth making them externally invisible.

- Titanium braces resemble stainless-steel braces but are lighter and just as strong.
   People with allergies to nickel in steel often choose titanium braces, but they are more expensive than stainless steel braces.
- Customized orthodontic treatment systems combine high technology including 3-D imaging, treatment planning software and a robot to custom bend the wire. Customized systems such as this offer faster treatment times and more efficient results.<sup>[5]</sup>
- Progressive, clear removable aligners may be used to gradually move teeth into their final positions. Aligners are generally not used for complex orthodontic cases, such as when extractions, jaw surgery, or palate expansion are necessary.<sup>[</sup>*medical citation* : [<sup>6</sup>]

#### **Fitting procedure**

[edit]



A patient's teeth are prepared for the application of braces.

Orthodontic services may be provided by any licensed dentist trained in orthodontics. In North America, most orthodontic treatment is done by orthodontists, who are dentists in the diagnosis and treatment of *malocclusions*—malalignments of the teeth, jaws, or both. A dentist must complete 2–3 years of additional post-doctoral training to earn a specialty certificate in orthodontics. There are many general practitioners who also provide orthodontic services.

The first step is to determine whether braces are suitable for the patient. The doctor consults with the patient and inspects the teeth visually. If braces are appropriate, a records appointment is set up where X-rays, moulds, and impressions are made. These records are analyzed to determine the problems and the proper course of action. The use of digital models is rapidly increasing in the orthodontic industry. Digital treatment starts with the creation of a three-dimensional digital model of the patient's arches. This model is produced by laser-scanning plaster models created using dental impressions. Computer-automated treatment simulation has the ability to automatically separate the gums and teeth from one another and can handle malocclusions well; this software enables clinicians to ensure, in a virtual setting, that the selected treatment will produce the optimal outcome, with minimal user input.<sup>[medical citation needed]</sup>

Typical treatment times vary from six months to two and a half years depending on the complexity and types of problems. Orthognathic surgery may be required in extreme cases. About 2 weeks before the braces are applied, orthodontic spacers may be required to spread apart back teeth in order to create enough space for the bands.

Teeth to be braced will have an adhesive applied to help the cement bond to the surface of the tooth. In most cases, the teeth will be banded and then brackets will be added. A bracket will be applied with dental cement, and then cured with light until hardened. This process usually takes a few seconds per tooth. If required, orthodontic spacers may be inserted between the molars to make room for molar bands to be placed at a later date. Molar bands are required to ensure brackets will stick. Bands are also utilized when dental fillings or other dental works make securing a bracket to a tooth infeasible. Orthodontic tubes (stainless steel tubes that allow wires to pass through them), also known as molar tubes, are directly bonded to molar teeth either by a chemical curing or a light curing adhesive. Usually, molar tubes are directly welded to bands, which is a metal ring that fits onto the molar tooth. Directly bonded molar tubes are associated with a higher failure rate when compared to molar bands cemented with glass ionomer cement. Failure of orthodontic brackets, bonded tubes or bands will increase the overall treatment time for the patient. There is evidence suggesting that there is less enamel decalcification associated with molar bands cemented with glass ionomer cement compared with orthodontic tubes directly cemented to molars using a light cured adhesive. Further evidence is needed to withdraw a more robust conclusion due to limited data. [']

An archwire will be threaded between the brackets and affixed with elastic or metal ligatures. Ligatures are available in a wide variety of colours, and the patient can choose which colour they like. Arch wires are bent, shaped, and tightened frequently to achieve the desired results.



Dental braces, with a transparent power chain, removed after completion of treatment.

Modern orthodontics makes frequent use of nickel-titanium archwires and temperaturesensitive materials. When cold, the archwire is limp and flexible, easily threaded between brackets of any configuration. Once heated to body temperature, the arch wire will stiffen and seek to retain its shape, creating constant light force on the teeth.

Brackets with hooks can be placed, or hooks can be created and affixed to the arch wire to affix rubber bands. The placement and configuration of the rubber bands will depend

on the course of treatment and the individual patient. Rubber bands are made in different diameters, colours, sizes, and strengths. They are also typically available in two versions: Coloured or clear/opaque.

The fitting process can vary between different types of braces, though there are similarities such as the initial steps of moulding the teeth before application. For example, with clear braces, impressions of a patient's teeth are evaluated to create a series of trays, which fit to the patient's mouth almost like a protective mouthpiece. With some forms of braces, the brackets are placed in a special form that is customized to the patient's mouth, drastically reducing the application time.

In many cases, there is insufficient space in the mouth for all the teeth to fit properly. There are two main procedures to make room in these cases. One is extraction: teeth are removed to create more space. The second is expansion, in which the palate or arch is made larger by using a palatal expander. Expanders can be used with both children and adults. Since the bones of adults are already fused, expanding the palate is not possible without surgery to separate them. An expander can be used on an adult without surgery but would be used to expand the dental arch, and not the palate.

Sometimes children and teenage patients, and occasionally adults, are required to wear a headgear appliance as part of the primary treatment phase to keep certain teeth from moving (for more detail on headgear and facemask appliances see Orthodontic headgear). When braces put pressure on one's teeth, the periodontal membrane stretches on one side and is compressed on the other. This movement needs to be done slowly or otherwise, the patient risks losing their teeth. This is why braces are worn as long as they are and adjustments are only made every so often.



Young Colombian man during an adjustment visit for his orthodontics

Braces are typically adjusted every three to six weeks. This helps shift the teeth into the correct position. When they get adjusted, the orthodontist removes the coloured or metal ligatures keeping the arch wire in place. The arch wire is then removed and may be replaced or modified. When the archwire has been placed back into the mouth, the patient may choose a colour for the new elastic ligatures, which are then affixed to the metal brackets. The adjusting process may cause some discomfort to the patient, which is normal.

#### **Post-treatment**

[edit]

Patients may need post-orthodontic surgery, such as a fiberotomy or alternatively a gum lift, to prepare their teeth for retainer use and improve the gumline contours after the braces come off. After braces treatment, patients can use a transparent plate to keep the teeth in alignment for a certain period of time. After treatment, patients usually use transparent plates for 6 months. In patients with long and difficult treatment, a fixative wire is attached to the back of the teeth to prevent the teeth from returning to their original state.<sup>[8]</sup>

# Retainers

[edit] Main article: Retainer (orthodontic device)



Hawley retainers are the most common type of retainers. This picture shows retainers for the top (right) and bottom (left) of the mouth.

In order to prevent the teeth from moving back to their original position, retainers are worn once the treatment is complete. Retainers help in maintaining and stabilizing the position of teeth long enough to permit the reorganization of the supporting structures after the active phase of orthodontic therapy. If the patient does not wear the retainer appropriately and/or for the right amount of time, the teeth may move towards their previous position. For regular braces, Hawley retainers are used. They are made of metal hooks that surround the teeth and are enclosed by an acrylic plate shaped to fit the patient's palate. For Clear Removable braces, an Essix retainer is used. This is similar to the original aligner; it is a clear plastic tray that is firmly fitted to the teeth and stays in place without a plate fitted to the palate. There is also a bonded retainer where a wire is permanently bonded to the lingual side of the teeth, usually the lower teeth only.

### Headgear

# [edit] Main article: Orthodontic headgear

Headgear needs to be worn between 12 and 22 hours each day to be effective in correcting the overbite, typically for 12 to 18 months depending on the severity of the overbite, how much it is worn and what growth stage the patient is in. Typically the prescribed daily wear time will be between 14 and 16 hours a day and is frequently used as a post-primary treatment phase to maintain the position of the jaw and arch. Headgear can be used during the night while the patient sleeps.[<sup>9</sup>]<sup>[</sup>better source needed<sup>]</sup>

Orthodontic headgear usually consists of three major components:



Full orthodontic headgear with head cap, fitting straps, facebow and elastics

- 1. Facebow: the facebow (or J-Hooks) is fitted with a metal arch onto headgear tubes attached to the rear upper and lower molars. This facebow then extends out of the mouth and around the patient's face. J-Hooks are different in that they hook into the patient's mouth and attach directly to the brace (see photo for an example of J-Hooks).
- 2. Head cap: the head cap typically consists of one or a number of straps fitting around the patient's head. This is attached with elastic bands or springs to the facebow. Additional straps and attachments are used to ensure comfort and safety (see photo).
- 3. Attachment: typically consisting of rubber bands, elastics, or springs—joins the facebow or J-Hooks and the head cap together, providing the force to move the upper teeth, jaw backwards.

The headgear application is one of the most useful appliances available to the orthodontist when looking to correct a Class II malocclusion. See more details in the section Orthodontic headgear.

#### **Pre-finisher**

[edit]

The pre-finisher is moulded to the patient's teeth by use of extreme pressure on the appliance by the person's jaw. The product is then worn a certain amount of time with the user applying force to the appliance in their mouth for 10 to 15 seconds at a time. The goal of the process is to increase the exercise time in applying the force to the appliance. If a person's teeth are not ready for a proper retainer the orthodontist may prescribe the use of a preformed finishing appliance such as the pre-finisher. This appliance fixes gaps between the teeth, small spaces between the upper and lower jaw, and other minor problems.

# **Complications and risks**

[edit]

A group of dental researchers, Fatma Boke, Cagri Gazioglu, Selvi Akkaya, and Murat Akkaya, conducted a study titled "Relationship between orthodontic treatment and gingival health." The results indicated that some orthodontist treatments result in gingivitis, also known as gum disease. The researchers concluded that functional appliances used to harness natural forces (such as improving the alignment of bites) do not usually have major effects on the gum after treatment.<sup>[10]</sup> However, fixed appliances such as braces, which most people get, can result in visible plaque, visible inflammation, and gum recession in a majority of the patients. The formation of plaques around the teeth of patients with braces is almost inevitable regardless of plaque control and can result in mild gingivitis. But if someone with braces does not clean their teeth carefully, plaques will form, leading to more severe gingivitis and gum recession.

Experiencing some pain following fitting and activation of fixed orthodontic braces is very common and several methods have been suggested to tackle this.[<sup>11</sup>][<sup>12</sup>] Pain associated with orthodontic treatment increases in proportion to the amount of force that is applied to the teeth. When a force is applied to a tooth via a brace, there is a reduction in the blood supply to the fibres that attach the tooth to the surrounding bone. This reduction in blood supply results in inflammation and the release of several chemical factors, which stimulate the pain response. Orthodontic pain can be managed using pharmacological interventions, which involve the use of analgesics applied locally or systemically. These analgesics are divided into four main categories, including opioids, non-steroidal anti-inflammatory drugs (NSAIDs), paracetamol and local anesthesia. The first three of these analgesics are commonly taken systemically to reduce orthodontic

# pain.[13]

A Cochrane Review in 2017 evaluated the pharmacological interventions for pain relief during orthodontic treatment. The study concluded that there was moderate-quality evidence that analgesics reduce the pain associated with orthodontic treatment. However, due to a lack of evidence, it was unclear whether systemic NSAIDs were more effective than paracetamol, and whether topical NSAIDs were more effective than local anaesthesia in the reduction of pain associated with orthodontic treatment. More high-quality research is required to investigate these particular comparisons.<sup>[13]</sup>

The dental displacement obtained with the orthodontic appliance determines in most cases some degree of root resorption. Only in a few cases is this side effect large enough to be considered real clinical damage to the tooth. In rare cases, the teeth may fall out or have to be extracted due to root resorption.[<sup>14</sup>][<sup>15</sup>]

#### History

[edit]

# Ancient

[edit]



Old Braces at a museum in Jbeil, Lebanon

According to scholars and historians, braces date back to ancient times. Around 400–300 BC, Hippocrates and Aristotle contemplated ways to straighten teeth and fix various dental conditions. Archaeologists have discovered numerous mummified ancient individuals with what appear to be metal bands wrapped around their teeth. Catgut, a type of cord made from the natural fibres of an animal's intestines, performed a similar role to today's orthodontic wire in closing gaps in the teeth and mouth.<sup>[16]</sup>

The Etruscans buried their dead with dental appliances in place to maintain space and prevent the collapse of the teeth during the afterlife. A Roman tomb was found with a number of teeth bound with gold wire documented as a ligature wire, a small elastic wire that is used to affix the arch wire to the bracket. Even Cleopatra wore a pair. Roman philosopher and physician Aulus Cornelius Celsus first recorded the treatment of teeth by

finger pressure. Unfortunately, due to a lack of evidence, poor preservation of bodies, and primitive technology, little research was carried out on dental braces until around the 17th century, although dentistry was making great advancements as a profession by then.<sup>[</sup>*citation nee* 

#### 18th century

[edit]



Portrait of Fauchard from his 1728 edition of "The Surgical Dentist".

Orthodontics truly began developing in the 18th and 19th centuries. In 1669, French dentist Pierre Fauchard, who is often credited with inventing modern orthodontics, published a book entitled *"The Surgeon Dentist"* on methods of straightening teeth. Fauchard, in his practice, used a device called a "Bandeau", a horseshoe-shaped piece of iron that helped expand the palate. In 1754, another French dentist, Louis Bourdet, dentist to the King of France, followed Fauchard's book with *The Dentist's Art*, which also dedicated a chapter to tooth alignment and application. He perfected the "Bandeau" and was the first dentist on record to recommend extraction of the premolar teeth to alleviate crowding and improve jaw growth.

#### 19th century

[edit]

Although teeth and palate straightening and/or pulling were used to improve the alignment of remaining teeth and had been practised since early times, orthodontics, as a science of its own, did not really exist until the mid-19th century. Several important dentists helped to

advance dental braces with specific instruments and tools that allowed braces to be improved.

In 1819, Christophe François Delabarre introduced the wire crib, which marked the birth of contemporary orthodontics, and gum elastics were first employed by Maynard in 1843. Tucker was the first to cut rubber bands from rubber tubing in 1850. Dentist, writer, artist, and sculptor Norman William Kingsley in 1858 wrote the first article on orthodontics and in 1880, his book, *Treatise on Oral Deformities*, was published. A dentist named John Nutting Farrar is credited for writing two volumes entitled, *A Treatise on the Irregularities of the Teeth and Their Corrections* and was the first to suggest the use of mild force at timed intervals to move teeth.

#### 20th century

[edit]

In the early 20th century, Edward Angle devised the first simple classification system for malocclusions, such as Class I, Class II, and so on. His classification system is still used today as a way for dentists to describe how crooked teeth are, what way teeth are pointing, and how teeth fit together. Angle contributed greatly to the design of orthodontic and dental appliances, making many simplifications. He founded the first school and college of orthodontics, organized the American Society of Orthodontia in 1901 which became the American Association of Orthodontists (AAO) in the 1930s, and founded the first orthodontic journal in 1907. Other innovations in orthodontics for children, published by J.J. Guilford in 1889, and the use of rubber elastics, pioneered by Calvin S. Case, along with Henry Albert Baker.

Today, space age wires (also known as dental arch wires) are used to tighten braces. In 1959, the Naval Ordnance Laboratory created an alloy of nickel and titanium called Nitinol. NASA further studied the material's physical properties.[<sup>17</sup>] In 1979, Dr. George Andreasen developed a new method of fixing braces with the use of the Nitinol wires based on their superelasticity. Andreasen used the wire on some patients and later found out that he could use it for the entire treatment. Andreasen then began using the nitinol wires for all his treatments and as a result, dental doctor visits were reduced, the cost of dental treatment was reduced, and patients reported less discomfort.

#### See also

- icon
   ImMedicine portaliknown
- Mandibular advancement splint
- Oral and maxillofacial surgery
- Orthognathic surgery

- Prosthodontics
- Trismus
- Dental implant

#### References

- 1. ^ "Dental Braces and Retainers". WebMD. Retrieved 2020-10-30.
- <sup>A</sup> Robling, Alexander G.; Castillo, Alesha B.; Turner, Charles H. (2006). "Biomechanical and Molecular Regulation of Bone Remodeling". Annual Review of Biomedical Engineering. 8: 455–498. doi:10.1146/annurev.bioeng.8.061505.095721. PMID 16834564.
- Toledo SR, Oliveira ID, Okamoto OK, Zago MA, de Seixas Alves MT, Filho RJ, et al. (September 2010). "Bone deposition, bone resorption, and osteosarcoma". Journal of Orthopaedic Research. 28 (9): 1142–1148. doi:10.1002/jor.21120. PMID 20225287. S2CID 22660771.
- 4. **^** "Metal Braces for Teeth: Braces Types, Treatment, Cost in India". Clove Dental. Retrieved 2025-02-06.
- Saxe, Alana K.; Louie, Lenore J.; Mah, James (2010). "Efficiency and effectiveness of SureSmile". World Journal of Orthodontics. 11 (1): 16–22. PMID 20209172.
- A Tamer, Ã,,°pek (December 2019). "Orthodontic Treatment with Clear Aligners and The Scientific Reality Behind Their Marketing: A Literature Review". Turkish Journal of Orthodontics. **32** (4): 241–246. doi:10.5152/TurkJOrthod.2019.18083. PMC 7018497. PMID 32110470.
- Millett DT, Mandall NA, Mattick RC, Hickman J, Glenny AM (February 2017). "Adhesives for bonded molar tubes during fixed brace treatment". The Cochrane Database of Systematic Reviews. 2 (3): CD008236. doi:10.1002/14651858.cd008236.pub3. PMC 6464028. PMID 28230910.
- 8. ^ Rubie J Patrick (2017). "What About Teeth After Braces?" 2017 "Health Journal Article" Toothcost Archived 2021-10-18 at the Wayback Machine
- 9. ^ Naten, Joshua. "Braces Headgear (Treatments)". toothcost.com. Archived from the original on 19 October 2021.
- A Boke, Fatma; Gazioglu, Cagri; Akkaya, Sevil; Akkaya, Murat (2014). "Relationship between orthodontic treatment and gingival health: A retrospective study". European Journal of Dentistry. 8 (3): 373–380. doi:10.4103/1305-7456.137651. ISSN 1305-7456. PMC 4144137. PMID 25202219.
- \* Eslamian L, Borzabadi-Farahani A, Hassanzadeh-Azhiri A, Badiee MR, Fekrazad R (March 2014). "The effect of 810-nm low-level laser therapy on pain caused by orthodontic elastomeric separators". Lasers in Medical Science. 29 (2): 559–64. doi:10.1007/s10103-012-1258-1. PMID 23334785. S2CID 25416518.
- \* Eslamian L, Borzabadi-Farahani A, Edini HZ, Badiee MR, Lynch E, Mortazavi A (September 2013). "The analgesic effect of benzocaine mucoadhesive patches on orthodontic pain caused by elastomeric separators, a preliminary study". Acta Odontologica Scandinavica. **71** (5): 1168–73. doi:10.3109/00016357.2012.757358.

PMID 23301559. S2CID 22561192.

- A *b* Monk AB, Harrison JE, Worthington HV, Teague A (November 2017). "Pharmacological interventions for pain relief during orthodontic treatment". The Cochrane Database of Systematic Reviews. **11** (12): CD003976. doi:10.1002/14651858.cd003976.pub2. PMC 6486038. PMID 29182798.
- Artun J, Smale I, Behbehani F, Doppel D, Van't Hof M, Kuijpers-Jagtman AM (November 2005). "Apical root resorption six and 12 months after initiation of fixed orthodontic appliance therapy". The Angle Orthodontist. **75** (6): 919–26. PMID 16448232.
- Mavragani M, Vergari A, Selliseth NJ, Bøe OE, Wisth PL (December 2000). "A radiographic comparison of apical root resorption after orthodontic treatment with a standard edgewise and a straight-wire edgewise technique". European Journal of Orthodontics. 22 (6): 665–74. doi:10.1093/ejo/22.6.665. PMID 11212602.
- Mahl N (February 2005). "Orthodontics in 3 millennia. Chapter 1: Antiquity to the mid-19th century". American Journal of Orthodontics and Dentofacial Orthopedics. 127 (2): 255–9. doi:10.1016/j.ajodo.2004.11.013. PMID 15750547.
- 17. **^** "NASA Technical Reports Server (NTRS)". Spinoff 1979. February 1979. Retrieved 2021-03-02.

# **External links**

[edit]

- Useful Resources: FAQ and Downloadable eBooks at Orthodontics Australia
- Orthos Explain: Treatment Options at Orthodontics Australia
- Media related to Dental braces at Wikimedia Commons
- o v
- o t
- **e**

Orthodontics

- Bolton analysis
- Cephalometric analysis
- Cephalometry
- Dentition analysis
- Failure of eruption of teeth

• Little's Irregularity Index

#### Diagnosis

- $\circ$  Malocclusion
- Scissor bite
- Standard anatomical position
- Tooth ankylosis
- Tongue thrust

- Overbite
- Overjet
- Open bite
- Crossbite
- Dental crowding
- Dental spacing

#### Conditions

- Prognathism
- Retrognathism
- Maxillary hypoplasia

• Bimaxillary Protrusion

- Condylar hyperplasia
- Overeruption
- Mouth breathing
- Temperomandibular dysfunction
- ACCO appliance
- Archwire
- Activator appliance
- Braces
- Damon system
- Elastics
- Frankel appliance
- Invisalign
- Lingual arch
- Lip bumper
- Herbst Appliance
- List of orthodontic functional appliances

#### Appliances

- Lingual braces
- Headgear
- Orthodontic technology

List of palatal expanders

- Orthodontic spacer
- Palatal lift prosthesis
- Palatal expander
- Quad helix
- Retainer
- SureSmile
- Self-ligating braces
- Splint activator
- Twin Block Appliance

- Anchorage (orthodontics)
- Cantilever mechanics
- Fiberotomy

# ProceduresInterproximal reductionIntrusion (orthodontics)

- Molar distalization
- SARPE
- Serial extraction
- Beta-titanium
- Nickel titanium
- Stainless steel

# Materials

- TiMolium Elgiloy
- Ceramic
- Composite
- Dental elastics

- Edward Angle
- Spencer Atkinson
- Clifford Ballard
- Raymond Begg
- Hans Peter Bimler
- Samir Bishara
- Arne Björk
- Charles B. Bolton
- Holly Broadbent Sr.
- Allan G. Brodie
- Charles J. Burstone
- Peter Buschang
- Calvin Case
- Harold Chapman (Orthodontist)
- David Di Biase
- Jean Delaire
- Terry Dischinger
- William B. Downs
- John Nutting Farrar
- Rolf Frankel
- Sheldon Friel
- Thomas M. Graber
- Charles A. Hawley
- Reed Holdaway
- John Hooper (Orthodontist)
- Joseph Jarabak
- Harold Kesling
- Albert Ketcham
- $\circ$  Juri Kurol

Notable contributors

- Craven KurzBenno Lischer
- James A. McNamara
- Birte Melsen
- Robert Moyers
- Hayes Nance
- Ravindra Nanda
- George Northcroft
- Dean Harold Noyes
- Frederick Bogue Noyes
- Albin Oppenheim
- Herbert A. Pullen
- Earl W. Renfroe
- Robert M. Ricketts
- Alfred Paul Rogers
- Ronald Roth
- Everett Shapiro
- L. F. Andrews
- Frederick Lester Stanton
- Earl Emanuel Shepard

	<ul> <li>American Association of Orthodontists</li> </ul>
	<ul> <li>American Board of Orthodontics</li> </ul>
	<ul> <li>British Orthodontic Society</li> </ul>
Organizations	<ul> <li>Canadian Association of Orthodontists</li> </ul>
	<ul> <li>Indian Orthodontic Society</li> </ul>
	<ul> <li>Italian Academy of Orthodontic Technology</li> </ul>
	<ul> <li>Society for Orthodontic Dental Technology (Germany)</li> </ul>
	<ul> <li>American Journal of Orthodontics and Dentofacial Orthopedics</li> </ul>
Journals	<ul> <li>The Angle Orthodontist</li> </ul>
	<ul> <li>Journal of Orthodontics</li> </ul>
Institution	<ul> <li>Angle School of Orthodontia</li> </ul>

• Germany

United States

Authority control databases: National East this at Wikidata

• BnF data

• Israel

#### About health professional

A health professional, healthcare professional, or healthcare worker (sometimes abbreviated HCW)[<sup>1</sup>] is a provider of health care treatment and advice based on formal training and experience. The field includes those who work as a nurse, physician (such as family physician, internist, obstetrician, psychiatrist, radiologist, surgeon etc.), physician assistant, registered dietitian, veterinarian, veterinary technician, optometrist, pharmacist, pharmacy technician, medical assistant, physical therapist, occupational therapist, dentist, midwife, psychologist, audiologist, or healthcare scientist, or who perform services in allied health professions. Experts in public health and community health are also health professionals.

#### **Fields**



NY College of Health Professions massage therapy class



US Navy doctors deliver a healthy baby

vte

Health practitioners and professionals

- Athletic trainer
- Audiologist
- Chiropractor
- Clinical coder
- Clinical nurse specialist
- Clinical officer
- Community health worker
- Dentist
- Dietitian and nutritionist
- Emergency medical technician
- Feldsher
- Health administrator
- Medical assistant
- Medical laboratory scientist
- Medical transcriptionist
- Nurse anesthetist
- Nurse practitioner
- Nurse midwife
- Nurse
- Occupational Therapist
- Optometrist
- Paramedic
- Pharmacist
- Pharmaconomist
- Pharmacy technician
- Phlebotomist
- Physician
- Physician assistant
- Podiatrist
- Psychologist
- Psychotherapist
- Physical therapist
- Radiographer
- Radiotherapist
- Respiratory therapist
- Speech-language pathologist
- Social Work
- Surgeon
- Surgeon's assistant
- Surgical technologist



70% of global health and social care workers are women, 30% of leaders in the global health sector are women

The healthcare workforce comprises a wide variety of professions and occupations who provide some type of healthcare service, including such direct care practitioners as physicians, nurse practitioners, physician assistants, nurses, respiratory therapists, dentists, pharmacists, speech-language pathologist, physical therapists, occupational therapists, physical and behavior therapists, as well as allied health professionals such as phlebotomists, medical laboratory scientists, dieticians, and social workers. They often work in hospitals, healthcare centers and other service delivery points, but also in academic training, research, and administration. Some provide care and treatment services for patients in private homes. Many countries have a large number of community health workers who work outside formal healthcare institutions. Managers of healthcare services, health information technicians, and other assistive personnel and support workers are also considered a vital part of health care teams.<sup>[2</sup>]

Healthcare practitioners are commonly grouped into health professions. Within each field of expertise, practitioners are often classified according to skill level and skill specialization. "Health professionals" are highly skilled workers, in professions that usually require extensive knowledge including university-level study leading to the award of a first degree or higher qualification.<sup>[3]</sup> This category includes physicians, physician assistants, registered nurses, veterinarians, veterinary technicians, veterinary assistants, dentists, midwives, radiographers, pharmacists, physiotherapists, optometrists, operating department practitioners and others. Allied health professionals, also referred to as "health associate professionals" in the International Standard Classification of Occupations, support implementation of health care, treatment and referral plans usually established by medical, nursing, respiratory care, and other health professionals, and usually require formal qualifications to practice their profession. In addition, unlicensed assistive personnel assist with providing health care services as permitted. *Licitation needed* 

Another way to categorize healthcare practitioners is according to the sub-field in which they practice, such as mental health care, pregnancy and childbirth care, surgical care, rehabilitation care, or public health.<sup>[</sup>*citation needed*]

#### Mental health

#### [edit]

Main article: Mental health professional

A mental health professional is a health worker who offers services to improve the mental health of individuals or treat mental illness. These include psychiatrists, psychiatry physician assistants, clinical, counseling, and school psychologists, occupational therapists, clinical social workers, psychiatric-mental health nurse practitioners, marriage and family therapists, mental health counselors, as well as other health professionals and allied health professions. These health care providers often deal with the same illnesses, disorders, conditions, and issues; however, their scope of practice often differs. The most significant difference across categories of mental health practitioners is education and training.<sup>[4</sup>] There are many damaging effects to the health care workers. Many have had diverse negative psychological symptoms ranging from emotional trauma to very severe anxiety. Health care workers have not been treated right and because of that their mental, physical, and emotional health has been affected by it. The SAGE author's said that there were 94% of nurses that had experienced at least one PTSD after the traumatic experience. Others have experienced nightmares, flashbacks, and short and long term emotional reactions.<sup>[5]</sup> The abuse is causing detrimental effects on these health care workers. Violence is causing health care workers to have a negative attitude toward work tasks and patients, and because of that they are "feeling pressured to accept the order, dispense a product, or administer a medication".<sup>[6</sup>] Sometimes it can range from verbal to sexual to physical harassment, whether the abuser is a patient, patient's families, physician, supervisors, or nurses. *citation needed* 

# Obstetrics

#### [edit]

Main articles: Obstetrics, Midwifery, and Birth attendant

A maternal and newborn health practitioner is a health care expert who deals with the care of women and their children before, during and after pregnancy and childbirth. Such health practitioners include obstetricians, physician assistants, midwives, obstetrical nurses and many others. One of the main differences between these professions is in the training and authority to provide surgical services and other life-saving interventions.<sup>[7]</sup> In some developing countries, traditional birth attendants, or traditional midwives, are the primary source of pregnancy and childbirth care for many women and families, although they are not certified or licensed. According to research, rates for unhappiness among obstetrician-gynecologists (Ob-Gyns) range somewhere between 40 and 75 percent.<sup>[8]</sup>

# Geriatrics

Main articles: Geriatrics and Geriatric care management

A geriatric care practitioner plans and coordinates the care of the elderly and/or disabled to promote their health, improve their quality of life, and maintain their independence for as long as possible.<sup>[9]</sup> They include geriatricians, occupational therapists, physician assistants, adult-gerontology nurse practitioners, clinical nurse specialists, geriatric clinical pharmacists, geriatric nurses, geriatric care managers, geriatric aides, nursing aides, caregivers and others who focus on the health and psychological care needs of older adults.<sup>[</sup>*citation needed*]

# Surgery

[edit]

A surgical practitioner is a healthcare professional and expert who specializes in the planning and delivery of a patient's perioperative care, including during the anaesthetic, surgical and recovery stages. They may include general and specialist surgeons, physician assistants, assistant surgeons, surgical assistants, veterinary surgeons, veterinary technicians. anesthesiologists, anesthesiologist assistants, nurse anesthetists, surgical nurses, clinical officers, operating department practitioners, anaesthetic technicians, perioperative nurses, surgical technologists, and others. *Icitation needed* 

#### Rehabilitation

[edit]

A rehabilitation care practitioner is a health worker who provides care and treatment which aims to enhance and restore functional ability and quality of life to those with physical impairments or disabilities. These include physiatrists, physician assistants, rehabilitation nurses, clinical nurse specialists, nurse practitioners, physiotherapists, chiropractors, orthotists, prosthetists, occupational therapists, recreational therapists, audiologists, speech and language pathologists, respiratory therapists, rehabilitation counsellors, physical rehabilitation therapists, athletic trainers, physiotherapy technicians, orthotic technicians, prosthetic technicians, personal care assistants, and others.<sup>[10</sup>]

#### Optometry

[edit] Main article: Optometry

Optometry is a field traditionally associated with the correction of refractive errors using glasses or contact lenses, and treating eye diseases. Optometrists also provide general eye care, including screening exams for glaucoma and diabetic retinopathy and

management of routine or eye conditions. Optometrists may also undergo further training in order to specialize in various fields, including glaucoma, medical retina, low vision, or paediatrics. In some countries, such as the United Kingdom, United States, and Canada, Optometrists may also undergo further training in order to be able to perform some surgical procedures.

# Diagnostics

[edit] Main article: Medical diagnosis

Medical diagnosis providers are health workers responsible for the process of determining which disease or condition explains a person's symptoms and signs. It is most often referred to as diagnosis with the medical context being implicit. This usually involves a team of healthcare providers in various diagnostic units. These include radiographers, radiologists, Sonographers, medical laboratory scientists, pathologists, and related professionals.<sup>[</sup>*citation needed*]

# Dentistry

[edit]



Dental assistant on the right supporting a dental operator on the left, during a procedure.

Main article: Dentistry

A dental care practitioner is a health worker and expert who provides care and treatment to promote and restore oral health. These include dentists and dental surgeons, dental assistants, dental auxiliaries, dental hygienists, dental nurses, dental technicians, dental therapists or oral health therapists, and related professionals.

#### Podiatry

Care and treatment for the foot, ankle, and lower leg may be delivered by podiatrists, chiropodists, pedorthists, foot health practitioners, podiatric medical assistants, podiatric nurse and others.

# Public health

[edit]

A public health practitioner focuses on improving health among individuals, families and communities through the prevention and treatment of diseases and injuries, surveillance of cases, and promotion of healthy behaviors. This category includes community and preventive medicine specialists, physician assistants, public health nurses, pharmacist, clinical nurse specialists, dietitians, environmental health officers (public health inspectors), paramedics, epidemiologists, public health dentists, and others.<sup>[</sup>citation needed<sup>]</sup>

#### Alternative medicine

[edit]

In many societies, practitioners of alternative medicine have contact with a significant number of people, either as integrated within or remaining outside the formal health care system. These include practitioners in acupuncture, Ayurveda, herbalism, homeopathy, naturopathy, Reiki, Shamballa Reiki energy healing Archived 2021-01-25 at the Wayback Machine, Siddha medicine, traditional Chinese medicine, traditional Korean medicine, Unani, and Yoga. In some countries such as Canada, chiropractors and osteopaths (not to be confused with doctors of osteopathic medicine in the United States) are considered alternative medicine practitioners.

#### **Occupational hazards**

[edit]

See also: Occupational hazards in dentistry and Nursing § Occupational hazards



A healthcare professional wears an air sampling device to investigate exposure to airborne influenza

A video describing the Occupational Health and Safety Network, a tool for monitoring occupational hazards to health care workers

The healthcare workforce faces unique health and safety challenges and is recognized by the National Institute for Occupational Safety and Health (NIOSH) as a priority industry sector in the National Occupational Research Agenda (NORA) to identify and provide intervention strategies regarding occupational health and safety issues.<sup>[11]</sup>

#### **Biological hazards**

[edit]

Exposure to respiratory infectious diseases like tuberculosis (caused by *Mycobacterium tuberculosis*) and influenza can be reduced with the use of respirators; this exposure is a significant occupational hazard for health care professionals.<sup>[12]</sup> Healthcare workers are also at risk for diseases that are contracted through extended contact with a patient, including scabies.<sup>[13]</sup> Health professionals are also at risk for contracting blood-borne diseases like hepatitis B, hepatitis C, and HIV/AIDS through needlestick injuries or contact with bodily fluids.<sup>[14]</sup><sup>[15]</sup> This risk can be mitigated with vaccination when there is a vaccine available, like with hepatitis B.<sup>[15]</sup> In epidemic situations, such as the 2014-2016 West African Ebola virus epidemic or the 2003 SARS outbreak, healthcare workers are at even greater risk, and were disproportionately affected in both the Ebola and SARS outbreaks.<sup>[16]</sup>

In general, appropriate personal protective equipment (PPE) is the first-line mode of protection for healthcare workers from infectious diseases. For it to be effective against highly contagious diseases, personal protective equipment must be watertight and prevent the skin and mucous membranes from contacting infectious material. Different levels of personal protective equipment created to unique standards are used in situations where the risk of infection is different. Practices such as triple gloving and multiple respirators do not provide a higher level of protection and present a burden to the worker, who is additionally at increased risk of exposure when removing the PPE. Compliance with appropriate personal protective equipment rules may be difficult in certain situations, such as tropical environments or low-resource settings. A 2020 Cochrane systematic review found low-quality evidence that using more breathable fabric in PPE, double gloving, and active training reduce the risk of contamination but that more randomized controlled trials are needed for how best to train healthcare workers in proper PPE use.[16]

#### Tuberculosis screening, testing, and education

Based on recommendations from The United States Center for Disease Control and Prevention (CDC) for TB screening and testing the following best practices should be followed when hiring and employing Health Care Personnel.<sup>17</sup>]

When hiring Health Care Personnel, the applicant should complete the following:[<sup>18</sup>] a TB risk assessment,[<sup>19</sup>] a TB symptom evaluation for at least those listed on the Signs & Symptoms page,[<sup>20</sup>] a TB test in accordance with the guidelines for Testing for TB Infection,[<sup>21</sup>] and additional evaluation for TB disease as needed (e.g. chest x-ray for HCP with a positive TB test)[<sup>18</sup>] The CDC recommends either a blood test, also known as an interferon-gamma release assay (IGRA), or a skin test, also known as a Mantoux tuberculin skin test (TST).[<sup>21</sup>] A TB blood test for baseline testing does not require two-step testing. If the skin test method is used to test HCP upon hire, then two-step testing should be used. A one-step test is not recommended.[<sup>18</sup>]

The CDC has outlined further specifics on recommended testing for several scenarios.[<sup>22</sup>] In summary:

- 1. Previous documented positive skin test (TST) then a further TST is not recommended
- 2. Previous documented negative TST within 12 months before employment OR at least two documented negative TSTs ever then a single TST is recommended
- 3. All other scenarios, with the exception of programs using blood tests, the recommended testing is a two-step TST

According to these recommended testing guidelines any two negative TST results within 12 months of each other constitute a two-step TST.

For annual screening, testing, and education, the only recurring requirement for all HCP is to receive TB education annually.[<sup>18</sup>] While the CDC offers education materials, there is not a well defined requirement as to what constitutes a satisfactory annual education. Annual TB testing is no longer recommended unless there is a known exposure or ongoing transmission at a healthcare facility. Should an HCP be considered at increased occupational risk for TB annual screening may be considered. For HCP with a documented history of a positive TB test result do not need to be re-tested but should instead complete a TB symptom evaluation. It is assumed that any HCP who has undergone a chest x-ray test has had a previous positive test result. When considering mental health you may see your doctor to be evaluated at your digression. It is recommended to see someone at least once a year in order to make sure that there has not been any sudden changes.[<sup>23</sup>]

#### **Psychosocial hazards**

Occupational stress and occupational burnout are highly prevalent among health professionals.[<sup>24</sup>] Some studies suggest that workplace stress is pervasive in the health care industry because of inadequate staffing levels, long work hours, exposure to infectious diseases and hazardous substances leading to illness or death, and in some countries threat of malpractice litigation. Other stressors include the emotional labor of caring for ill people and high patient loads. The consequences of this stress can include substance abuse, suicide, major depressive disorder, and anxiety, all of which occur at higher rates in health professionals than the general working population. Elevated levels of stress are also linked to high rates of burnout, absenteeism and diagnostic errors, and reduced rates of patient satisfaction.[<sup>25</sup>] In Canada, a national report (*Canada's Health Care Providers*) also indicated higher rates of absenteeism due to illness or disability among health care workers compared to the rest of the working population, although those working in health care reported similar levels of good health and fewer reports of being injured at work.[<sup>26</sup>]

There is some evidence that cognitive-behavioral therapy, relaxation training and therapy (including meditation and massage), and modifying schedules can reduce stress and burnout among multiple sectors of health care providers. Research is ongoing in this area, especially with regards to physicians, whose occupational stress and burnout is less researched compared to other health professions.<sup>27</sup>]

Healthcare workers are at higher risk of on-the-job injury due to violence. Drunk, confused, and hostile patients and visitors are a continual threat to providers attempting to treat patients. Frequently, assault and violence in a healthcare setting goes unreported and is wrongly assumed to be part of the job.[<sup>28</sup>] Violent incidents typically occur during one-on-one care; being alone with patients increases healthcare workers' risk of assault.[<sup>29</sup>] In the United States, healthcare workers experience 2?3 of nonfatal workplace violence incidents.[<sup>28</sup>] Psychiatric units represent the highest proportion of violent incidents, at 40%; they are followed by geriatric units (20%) and the emergency department (10%). Workplace violence can also cause psychological trauma.[<sup>29</sup>]

Health care professionals are also likely to experience sleep deprivation due to their jobs. Many health care professionals are on a shift work schedule, and therefore experience misalignment of their work schedule and their circadian rhythm. In 2007, 32% of healthcare workers were found to get fewer than 6 hours of sleep a night. Sleep deprivation also predisposes healthcare professionals to make mistakes that may potentially endanger a patient.[ $^{30}$ ]

#### **COVID** pandemic

[edit]

Especially in times like the present (2020), the hazards of health professional stem into the mental health. Research from the last few months highlights that COVID-19 has
contributed greatly to the degradation of mental health in healthcare providers. This includes, but is not limited to, anxiety, depression/burnout, and insomnia. *citation needed* 

A study done by Di Mattei et al. (2020) revealed that 12.63% of COVID nurses and 16.28% of other COVID healthcare workers reported extremely severe anxiety symptoms at the peak of the pandemic.[<sup>31</sup>] In addition, another study was conducted on 1,448 full time employees in Japan. The participants were surveyed at baseline in March 2020 and then again in May 2020. The result of the study showed that psychological distress and anxiety had increased more among healthcare workers during the COVID-19 outbreak.[<sup>32</sup>]

Similarly, studies have also shown that following the pandemic, at least one in five healthcare professionals report symptoms of anxiety.[<sup>33</sup>] Specifically, the aspect of "anxiety was assessed in 12 studies, with a pooled prevalence of 23.2%" following COVID.[<sup>33</sup>] When considering all 1,448 participants that percentage makes up about 335 people.

# Abuse by patients

[edit]

- The patients are selecting victims who are more vulnerable. For example, Cho said that these would be the nurses that are lacking experience or trying to get used to their new roles at work.<sup>[34]</sup>
- Others authors that agree with this are Vento, Cainelli, & Vallone and they said that, the reason patients have caused danger to health care workers is because of insufficient communication between them, long waiting lines, and overcrowding in waiting areas.[<sup>35</sup>] When patients are intrusive and/or violent toward the faculty, this makes the staff question what they should do about taking care of a patient.
- There have been many incidents from patients that have really caused some health care workers to be traumatized and have so much self doubt. Goldblatt and other authors said that there was a lady who was giving birth, her husband said, "Who is in charge around here"? "Who are these sluts you employ here".<sup>[5</sup>] This was very avoidable to have been said to the people who are taking care of your wife and child.

# Physical and chemical hazards

[edit]

Slips, trips, and falls are the second-most common cause of worker's compensation claims in the US and cause 21% of work absences due to injury. These injuries most commonly result in strains and sprains; women, those older than 45, and those who have been working less than a year in a healthcare setting are at the highest risk.[<sup>36</sup>]

An epidemiological study published in 2018 examined the hearing status of noiseexposed health care and social assistance (HSA) workers sector to estimate and compare the prevalence of hearing loss by subsector within the sector. Most of the HSA subsector prevalence estimates ranged from 14% to 18%, but the Medical and Diagnostic Laboratories subsector had 31% prevalence and the Offices of All Other Miscellaneous Health Practitioners had a 24% prevalence. The Child Day Care Services subsector also had a 52% higher risk than the reference industry.[<sup>37</sup>]

Exposure to hazardous drugs, including those for chemotherapy, is another potential occupational risk. These drugs can cause cancer and other health conditions.[<sup>38</sup>]

#### **Gender factors**

#### [edit]

Female health care workers may face specific types of workplace-related health conditions and stress. According to the World Health Organization, women predominate in the formal health workforce in many countries and are prone to musculoskeletal injury (caused by physically demanding job tasks such as lifting and moving patients) and burnout. Female health workers are exposed to hazardous drugs and chemicals in the workplace which may cause adverse reproductive outcomes such as spontaneous abortion and congenital malformations. In some contexts, female health workers are also subject to gender-based violence from coworkers and patients.<sup>[39</sup>][<sup>40</sup>]

### Workforce shortages

[edit]

See also: Health workforce, Doctor shortage, and Nursing shortage

Many jurisdictions report shortfalls in the number of trained health human resources to meet population health needs and/or service delivery targets, especially in medically underserved areas. For example, in the United States, the 2010 federal budget invested \$330 million to increase the number of physicians, physician assistants, nurse practitioners, nurses, and dentists practicing in areas of the country experiencing shortages of trained health professionals. The Budget expands loan repayment programs for physicians, nurses, and dentists who agree to practice in medically underserved areas. This funding will enhance the capacity of nursing schools to increase the number of nurses. It will also allow states to increase access to oral health care through dental workforce development grants. The Budget's new resources will sustain the expansion of the health care workforce funded in the Recovery Act.[<sup>41</sup>] There were 15.7 million health care professionals in the US as of 2011.[<sup>36</sup>]

In Canada, the 2011 federal budget announced a Canada Student Loan forgiveness program to encourage and support new family physicians, physician assistants, nurse practitioners and nurses to practice in underserved rural or remote communities of the country, including communities that provide health services to First Nations and Inuit populations.[<sup>42</sup>]

In Uganda, the Ministry of Health reports that as many as 50% of staffing positions for health workers in rural and underserved areas remain vacant. As of early 2011, the Ministry was conducting research and costing analyses to determine the most appropriate attraction and retention packages for medical officers, nursing officers, pharmacists, and laboratory technicians in the country's rural areas.<sup>[43]</sup>

At the international level, the World Health Organization estimates a shortage of almost 4.3 million doctors, midwives, nurses, and support workers worldwide to meet target coverage levels of essential primary health care interventions.[<sup>44</sup>] The shortage is reported most severe in 57 of the poorest countries, especially in sub-Saharan Africa.

Nurses are the most common type of medical field worker to face shortages around the world. There are numerous reasons that the nursing shortage occurs globally. Some include: inadequate pay, a large percentage of working nurses are over the age of 45 and are nearing retirement age, burnout, and lack of recognition.[<sup>45</sup>]

Incentive programs have been put in place to aid in the deficit of pharmacists and pharmacy students. The reason for the shortage of pharmacy students is unknown but one can infer that it is due to the level of difficulty in the program.<sup>[46</sup>]

Results of nursing staff shortages can cause unsafe staffing levels that lead to poor patient care. Five or more incidents that occur per day in a hospital setting as a result of nurses who do not receive adequate rest or meal breaks is a common issue.<sup>47</sup>

### **Regulation and registration**

[edit] Main article: Health professional requisites

Practicing without a license that is valid and current is typically illegal. In most jurisdictions, the provision of health care services is regulated by the government. Individuals found to be providing medical, nursing or other professional services without the appropriate certification or license may face sanctions and criminal charges leading to a prison term. The number of professions subject to regulation, requisites for individuals to receive professional licensure, and nature of sanctions that can be imposed for failure to comply vary across jurisdictions.

In the United States, under Michigan state laws, an individual is guilty of a felony if identified as practicing in the health profession without a valid personal license or

registration. Health professionals can also be imprisoned if found guilty of practicing beyond the limits allowed by their licenses and registration. The state laws define the scope of practice for medicine, nursing, and a number of allied health professions.[<sup>48</sup>]<sup>[</sup>unreliable In Florida, practicing medicine without the appropriate license is a crime classified as a third degree felony,[<sup>49</sup>] which may give imprisonment up to five years. Practicing a health care profession without a license which results in serious bodily injury classifies as a second degree felony,[<sup>49</sup>] providing up to 15 years' imprisonment.

In the United Kingdom, healthcare professionals are regulated by the state; the UK Health and Care Professions Council (HCPC) protects the 'title' of each profession it regulates. For example, it is illegal for someone to call himself an Occupational Therapist or Radiographer if they are not on the register held by the HCPC.

### See also

### [edit]

- List of healthcare occupations
- Community health center
- Chronic care management
- Electronic superbill
- Geriatric care management
- Health human resources
- Uniform Emergency Volunteer Health Practitioners Act

# References

[edit]

- 1. "HCWs With Long COVID Report Doubt, Disbelief From Colleagues". Medscape. 29 November 2021.
- 2. **^** World Health Organization, 2006. *World Health Report 2006: working together for health.* Geneva: WHO.
- 3. **^** "Classifying health workers" (PDF). World Health Organization. Geneva. 2010. Archived (PDF) from the original on 2015-08-16. Retrieved 2016-02-13.
- 4. **^** "Difference Between Psychologists and Psychiatrists". Psychology.about.com. 2007. Archived from the original on April 3, 2007. Retrieved March 4, 2007.
- A *b* Goldblatt, Hadass; Freund, Anat; Drach-Zahavy, Anat; Enosh, Guy; Peterfreund, Ilana; Edlis, Neomi (2020-05-01). "Providing Health Care in the Shadow of Violence: Does Emotion Regulation Vary Among Hospital Workers From Different Professions?". Journal of Interpersonal Violence. *35* (9–10): 1908–1933. doi:10.1177/0886260517700620. ISSN 0886-2605. PMID 29294693. S2CID 19304885.
- A Johnson, Cheryl L.; DeMass Martin, Suzanne L.; Markle-Elder, Sara (April 2007). "Stopping Verbal Abuse in the Workplace". American Journal of Nursing. 107 (4): 32–34. doi:10.1097/01.naj.0000271177.59574.c5. ISSN 0002-936X. PMID 17413727.

- A Gupta N et al. "Human resources for maternal, newborn and child health: from measurement and planning to performance for improved health outcomes. Archived 2015-09-24 at the Wayback Machine *Human Resources for Health*, 2011, 9(16). Retrieved 20 October 2011.
- 8. **^** "Ob-Gyn Burnout: Why So Many Doctors Are Questioning Their Calling". healthecareers.com. Retrieved 2023-05-22.
- Araujo de Carvalho, Islene; Epping-Jordan, JoAnne; Pot, Anne Margriet; Kelley, Edward; Toro, Nuria; Thiyagarajan, Jotheeswaran A; Beard, John R (2017-11-01). "Organizing integrated health-care services to meet older people's needs". Bulletin of the World Health Organization. 95 (11): 756–763. doi:10.2471/BLT.16.187617 (inactive 5 December 2024). ISSN 0042-9686. PMC 5677611. PMID 29147056.cite journal: CS1 maint: DOI inactive as of December 2024 (link)
- <sup>•</sup> Gupta N et al. "Health-related rehabilitation services: assessing the global supply of and need for human resources." Archived 2012-07-20 at the Wayback Machine *BMC Health Services Research*, 2011, 11:276. Published 17 October 2011. Retrieved 20 October 2011.
- 11. **^** "National Occupational Research Agenda for Healthcare and Social Assistance | NIOSH | CDC". www.cdc.gov. 2019-02-15. Retrieved 2019-03-14.
- 12. A Bergman, Michael; Zhuang, Ziqing; Shaffer, Ronald E. (25 July 2013). "Advanced Headforms for Evaluating Respirator Fit". National Institute for Occupational Safety and Health. Archived from the original on 16 January 2015. Retrieved 18 January 2015.
- \* FitzGerald, Deirdre; Grainger, Rachel J.; Reid, Alex (2014). "Interventions for preventing the spread of infestation in close contacts of people with scabies". The Cochrane Database of Systematic Reviews. 2014 (2): CD009943. doi:10.1002/14651858.CD009943.pub2. ISSN 1469-493X. PMC 10819104. PMID 24566946.
- Cunningham, Thomas; Burnett, Garrett (17 May 2013). "Does your workplace culture help protect you from hepatitis?". National Institute for Occupational Safety and Health. Archived from the original on 18 January 2015. Retrieved 18 January 2015.
- A *b* Reddy, Viraj K; Lavoie, Marie-Claude; Verbeek, Jos H; Pahwa, Manisha (14 November 2017). "Devices for preventing percutaneous exposure injuries caused by needles in healthcare personnel". Cochrane Database of Systematic Reviews. 2017 (11): CD009740. doi:10.1002/14651858.CD009740.pub3. PMC 6491125. PMID 29190036.
- A *b* Verbeek, Jos H.; Rajamaki, Blair; Ijaz, Sharea; Sauni, Riitta; Toomey, Elaine; Blackwood, Bronagh; Tikka, Christina; Ruotsalainen, Jani H.; Kilinc Balci, F. Selcen (May 15, 2020). "Personal protective equipment for preventing highly infectious diseases due to exposure to contaminated body fluids in healthcare staff". The Cochrane Database of Systematic Reviews. 2020 (5): CD011621. doi:10.1002/14651858.CD011621.pub5. hdl:1983/b7069408-3bf6-457a-9c6fecc38c00ee48. ISSN 1469-493X. PMC 8785899. PMID 32412096. S2CID 218649177.

- Sosa, Lynn E. (April 2, 2019). "Tuberculosis Screening, Testing, and Treatment of U.S. Health Care Personnel: Recommendations from the National Tuberculosis Controllers Association and CDC, 2019". MMWR. Morbidity and Mortality Weekly Report. 68 (19): 439–443. doi:10.15585/mmwr.mm6819a3. PMC 6522077. PMID 31099768.
- 18. ^ *a b c d* "Testing Health Care Workers | Testing & Diagnosis | TB | CDC". www.cdc.gov. March 8, 2021.
- 19. **^** "Health Care Personnel (HCP) Baseline Individual TB Risk Assessment" (PDF). cdc.gov. Retrieved 18 September 2022.
- 20. **^** "Signs & Symptoms | Basic TB Facts | TB | CDC". www.cdc.gov. February 4, 2021.
- 21. ^ *a b* "Testing for TB Infection | Testing & Diagnosis | TB | CDC". www.cdc.gov. March 8, 2021.
- 22. **^** "Guidelines for Preventing the Transmission of Mycobacterium tuberculosis in Health-Care Settings, 2005". www.cdc.gov.
- 23. A Spoorthy, Mamidipalli Sai; Pratapa, Sree Karthik; Mahant, Supriya (June 2020). "Mental health problems faced by healthcare workers due to the COVID-19 pandemic—A review". Asian Journal of Psychiatry. 51: 102119. doi:10.1016/j.ajp.2020.102119. PMC 7175897. PMID 32339895.
- Ruotsalainen, Jani H.; Verbeek, Jos H.; Mariné, Albert; Serra, Consol (2015-04-07). "Preventing occupational stress in healthcare workers". The Cochrane Database of Systematic Reviews. 2015 (4): CD002892. doi:10.1002/14651858.CD002892.pub5. ISSN 1469-493X. PMC 6718215. PMID 25847433.
- 25. \* "Exposure to Stress: Occupational Hazards in Hospitals". NIOSH Publication No. 2008–136 (July 2008). 2 December 2008. doi:10.26616/NIOSHPUB2008136. Archived from the original on 12 December 2008.
- 26. **^** Canada's Health Care Providers, 2007 (Report). Ottawa: Canadian Institute for Health Information. 2007. Archived from the original on 2011-09-27.
- Ruotsalainen, JH; Verbeek, JH; Mariné, A; Serra, C (7 April 2015). "Preventing occupational stress in healthcare workers". The Cochrane Database of Systematic Reviews. 2015 (4): CD002892. doi:10.1002/14651858.CD002892.pub5. PMC 6718215. PMID 25847433.
- 28. ^ *a b* Hartley, Dan; Ridenour, Marilyn (12 August 2013). "Free On-line Violence Prevention Training for Nurses". National Institute for Occupational Safety and Health. Archived from the original on 16 January 2015. Retrieved 15 January 2015.
- A a b Hartley, Dan; Ridenour, Marilyn (September 13, 2011). "Workplace Violence in the Healthcare Setting". NIOSH: Workplace Safety and Health. Medscape and NIOSH. Archived from the original on February 8, 2014.
- 30. **^** Caruso, Claire C. (August 2, 2012). "Running on Empty: Fatigue and Healthcare Professionals". NIOSH: Workplace Safety and Health. Medscape and NIOSH. Archived from the original on May 11, 2013.
- Di Mattei, Valentina; Perego, Gaia; Milano, Francesca; Mazzetti, Martina; Taranto, Paola; Di Pierro, Rossella; De Panfilis, Chiara; Madeddu, Fabio; Preti, Emanuele (2021-05-15). "The "Healthcare Workers' Wellbeing (Benessere Operatori)" Project:

A Picture of the Mental Health Conditions of Italian Healthcare Workers during the First Wave of the COVID-19 Pandemic". International Journal of Environmental Research and Public Health. **18** (10): 5267. doi:10.3390/ijerph18105267. ISSN 1660-4601. PMC 8156728. PMID 34063421.

- Sasaki, Natsu; Kuroda, Reiko; Tsuno, Kanami; Kawakami, Norito (2020-11-01). "The deterioration of mental health among healthcare workers during the COVID-19 outbreak: A population-based cohort study of workers in Japan". Scandinavian Journal of Work, Environment & Health. 46 (6): 639–644. doi:10.5271/sjweh.3922. ISSN 0355-3140. PMC 7737801. PMID 32905601.
- A *b* Pappa, Sofia; Ntella, Vasiliki; Giannakas, Timoleon; Giannakoulis, Vassilis G.; Papoutsi, Eleni; Katsaounou, Paraskevi (August 2020). "Prevalence of depression, anxiety, and insomnia among healthcare workers during the COVID-19 pandemic: A systematic review and meta-analysis". Brain, Behavior, and Immunity. *88*: 901–907. doi:10.1016/j.bbi.2020.05.026. PMC 7206431. PMID 32437915.
- Cho, Hyeonmi; Pavek, Katie; Steege, Linsey (2020-07-22). "Workplace verbal abuse, nurse-reported quality of care and patient safety outcomes among earlycareer hospital nurses". Journal of Nursing Management. 28 (6): 1250–1258. doi: 10.1111/jonm.13071. ISSN 0966-0429. PMID 32564407. S2CID 219972442.
- Vento, Sandro; Cainelli, Francesca; Vallone, Alfredo (2020-09-18). "Violence Against Healthcare Workers: A Worldwide Phenomenon With Serious Consequences". Frontiers in Public Health. 8: 570459. doi: 10.3389/fpubh.2020.570459. ISSN 2296-2565. PMC 7531183. PMID 33072706.
- 36. ^ *a b* Collins, James W.; Bell, Jennifer L. (June 11, 2012). "Slipping, Tripping, and Falling at Work". NIOSH: Workplace Safety and Health. Medscape and NIOSH. Archived from the original on December 3, 2012.
- Masterson, Elizabeth A.; Themann, Christa L.; Calvert, Geoffrey M. (2018-04-15). "Prevalence of Hearing Loss Among Noise-Exposed Workers Within the Health Care and Social Assistance Sector, 2003 to 2012". Journal of Occupational and Environmental Medicine. 60 (4): 350–356. doi:10.1097/JOM.00000000001214. ISSN 1076-2752. PMID 29111986. S2CID 4637417.
- 38. **^** Connor, Thomas H. (March 7, 2011). "Hazardous Drugs in Healthcare". NIOSH: Workplace Safety and Health. Medscape and NIOSH. Archived from the original on March 7, 2012.
- 39. **^** World Health Organization. *Women and health: today's evidence, tomorrow's agenda*. Archived 2012-12-25 at the Wayback Machine Geneva, 2009. Retrieved on March 9, 2011.
- 40. **^** Swanson, Naomi; Tisdale-Pardi, Julie; MacDonald, Leslie; Tiesman, Hope M. (13 May 2013). "Women's Health at Work". National Institute for Occupational Safety and Health. Archived from the original on 18 January 2015. Retrieved 21 January 2015.
- 41. **^** "Archived copy" (PDF). Office of Management and Budget. Retrieved 2009-03-06 – via National Archives.
- 42. <sup>A</sup> Government of Canada. 2011. *Canada's Economic Action Plan: Forgiving Loans for New Doctors and Nurses in Under-Served Rural and Remote Areas*. Ottawa, 22 March 2011. Retrieved 23 March 2011.

- 43. A Rockers P et al. Determining Priority Retention Packages to Attract and Retain Health Workers in Rural and Remote Areas in Uganda. Archived 2011-05-23 at the Wayback Machine CapacityPlus Project. February 2011.
- 44. **^** "The World Health Report 2006 Working together for health". Geneva: WHO: World Health Organization. 2006. Archived from the original on 2011-02-28.
- Mefoh, Philip Chukwuemeka; Ude, Eze Nsi; Chukwuorji, JohBosco Chika (2019-01-02). "Age and burnout syndrome in nursing professionals: moderating role of emotion-focused coping". Psychology, Health & Medicine. 24 (1): 101–107. doi:10.1080/13548506.2018.1502457. ISSN 1354-8506. PMID 30095287. S2CID 51954488.
- A Traynor, Kate (2003-09-15). "Staffing shortages plague nation's pharmacy schools". American Journal of Health-System Pharmacy. 60 (18): 1822–1824. doi: 10.1093/ajhp/60.18.1822. ISSN 1079-2082. PMID 14521029.
- A. Leslie, G. D. (October 2008). "Critical Staffing shortage". Australian Nursing Journal. 16 (4): 16–17. doi:10.1016/s1036-7314(05)80033-5. ISSN 1036-7314. PMID 14692155.
- 48. ^ wiki.bmezine.com --> Practicing Medicine. In turn citing Michigan laws
- 49. ^ *a b* CHAPTER 2004-256 Committee Substitute for Senate Bill No. 1118 Archived 2011-07-23 at the Wayback Machine State of Florida, Department of State.

# **External links**

[edit]

- World Health Organization: Health workers
- v
- o t
- **e**

Health care

- Economics
- Equipment
- Guidelines
- Industry
- Philosophy
- Policy
- Providers
- Public health
- Ranking
- Reform
- System

Professions	• Medicine
	○ Nursing
	<ul> <li>Pharmacy</li> </ul>
	<ul> <li>Healthcare science</li> </ul>
	<ul> <li>Dentistry</li> </ul>
	<ul> <li>Allied health professions</li> </ul>
	<ul> <li>Health information management</li> </ul>
Settings	<ul> <li>Assisted living</li> </ul>
	<ul> <li>Hospital</li> </ul>
	<ul> <li>Medical school (Academic health science centre, Teaching hospital)</li> </ul>
	<ul> <li>Pharmacy school</li> </ul>
	$\circ$ Supervised injection site
Care	
	• Self
Skills / training	Bedside manner
	Cultural competence
	<ul> <li>Education</li> </ul>
	<ul> <li>Universal precautions</li> </ul>
Technology	<ul> <li>3D bioprinting</li> </ul>
	<ul> <li>Artificial intelligence</li> </ul>
	<ul> <li>Connected health</li> </ul>
	<ul> <li>Digital health</li> </ul>
	<ul> <li>Electronic health records</li> </ul>
	<ul> <li>mHealth</li> </ul>
	<ul> <li>Nanomedicine</li> </ul>
	<ul> <li>Telemedicine</li> </ul>

	<ul> <li>Medical image computing and imaging informatics</li> </ul>	
	<ul> <li>Artificial intelligence in healthcare</li> </ul>	
	<ul> <li>Neuroinformatics in healthcare</li> </ul>	
	<ul> <li>Behavior informatics in healthcare</li> </ul>	
	<ul> <li>Computational biology in healthcare</li> </ul>	
Health	<ul> <li>Translational bioinformatics</li> </ul>	
informatics	<ul> <li>Translational medicine</li> </ul>	
	<ul> <li>health information technology</li> </ul>	
	• Telemedicine	
	<ul> <li>Public health informatics</li> </ul>	
	<ul> <li>Health information management</li> </ul>	
	<ul> <li>Consumer health informatics</li> </ul>	
	<ul> <li>United States</li> </ul>	
	<ul> <li>reform debate in the United States</li> </ul>	
	$\circ$ History of public health in the United States	
By country	<ul> <li>United Kingdom</li> </ul>	
By country	<ul> <li>○ Canada</li> </ul>	
	<ul> <li>Australia</li> </ul>	
	<ul> <li>New Zealand</li> </ul>	
	<ul> <li>(Category Health care by country)</li> </ul>	
• Category ye unknown		

Authority control databases: National Edit this at Wikidata

**Frequently Asked Questions** 

What are the primary responsibilities of an orthodontist when treating my child?

An orthodontists key responsibilities include: conducting comprehensive initial assessments, creating personalized treatment plans, monitoring progress, explaining treatment procedures, managing potential complications, and ensuring the childs comfort and understanding throughout the orthodontic process.

How will the orthodontist ensure my childs safety during treatment?

The orthodontist ensures safety by: using sterilized equipment, following strict hygiene protocols, conducting regular health screenings, using age-appropriate techniques, explaining procedures to minimize anxiety, monitoring potential side effects, and maintaining detailed medical records.

What information should I expect the orthodontist to provide about my childs treatment?

The orthodontist should provide: a detailed treatment plan, estimated duration of treatment, expected outcomes, potential risks, cost breakdown, recommended oral hygiene practices, follow-up schedule, and clear communication about each stage of the orthodontic process.

#### IQDENT - Ortodontska Klinika

Phone : +385953817015

City : Zagreb

State : Hrvatska

Zip : 10000

Address : IQDENT - Ortodontska Klinika

Company Website : <u>https://iqdent.hr/</u>

USEFUL LINKS

### Orthodontic treatment can help improve your child's smile

Orthodontic treatment for children

# Sitemap

Privacy Policy

About Us

Follow us