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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
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Navigating the world of orthodontic treatment for children can be both exciting and financially challenging for parents. Understanding payment plans and financing arrangements can make the journey to a perfect smile much more manageable.

Orthodontic care can improve both dental health and self-confidence **Orthodontics for young children** crossbite.

Most orthodontic practices recognize that braces are a significant investment for families. That's why many offices now offer flexible payment options that can help spread out the cost over time. Typically, these arrangements come in several forms. Some practices provide in-house payment plans where you can break down the total cost into monthly installments, often with little or no interest.

Credit options have also become increasingly popular. Many orthodontists partner with specialized medical financing companies that offer specific healthcare credit lines. These can be particularly helpful for families who want to manage their expenses without paying the entire amount upfront. Companies like CareCredit, for example, often provide promotional periods with zero percent interest if the balance is paid within a specific timeframe.

Some families might also explore dental insurance options. While not all insurance plans cover orthodontic treatment completely, many provide partial coverage that can significantly reduce out-of-pocket expenses. It's worth checking with your insurance provider to understand the extent of your orthodontic benefits.

Another emerging trend is flexible spending accounts (FSAs) or health savings accounts (HSAs), which allow families to set aside pre-tax dollars for medical expenses. These can be an excellent way to reduce the overall financial burden of orthodontic treatment.

The key is to have an open conversation with your orthodontist's financial coordinator. Most practices are willing to work with families to find a solution that fits their budget. Don't be afraid to ask about all available options and discuss your financial constraints honestly.

Remember, investing in your child's smile is more than just a cosmetic decision. Proper orthodontic treatment can improve oral health, boost confidence, and provide long-term benefits that extend far beyond the initial cost.

Understanding the Financial Landscape of Pediatric Orthodontic Care

Navigating the world of orthodontic treatment for children can feel like walking through a financial maze. Parents often find themselves overwhelmed by the potential costs associated with braces, aligners, and other corrective dental procedures. The reality is that orthodontic care is a significant investment in a child's health and future confidence.

Most families quickly realize that orthodontic treatment isn't a simple one-time expense. Depending on the complexity of the case, treatment can range from a few thousand to several thousand dollars. This financial burden can feel daunting, but fortunately, there are multiple strategies to make the process more manageable.

Many orthodontic practices now offer flexible payment plans that break down the total cost into more digestible monthly installments. These arrangements can be a lifeline for families working within a tight budget. Some offices provide interest-free options for patients who commit to consistent monthly payments, which can significantly ease the financial strain.

Dental insurance can also play a crucial role in offsetting costs. While coverage varies, many plans provide partial reimbursement for orthodontic treatment, especially for children under 18. Some employers offer flexible spending accounts or health savings accounts that can be used to cover these medical expenses, providing additional financial relief.

For families without insurance or facing substantial out-of-pocket expenses, many orthodontists now partner with third-party financing companies. These organizations offer specialized medical loans with competitive interest rates and flexible repayment terms. Some even provide options for patients with less-than-perfect credit, ensuring that financial constraints don't prevent children from receiving necessary dental care.

It's worth noting that early intervention can sometimes reduce overall treatment costs. Addressing orthodontic issues during childhood can prevent more complex and expensive treatments later. Parents are encouraged to consult with orthodontic professionals early to develop a strategic approach to their child's dental health.

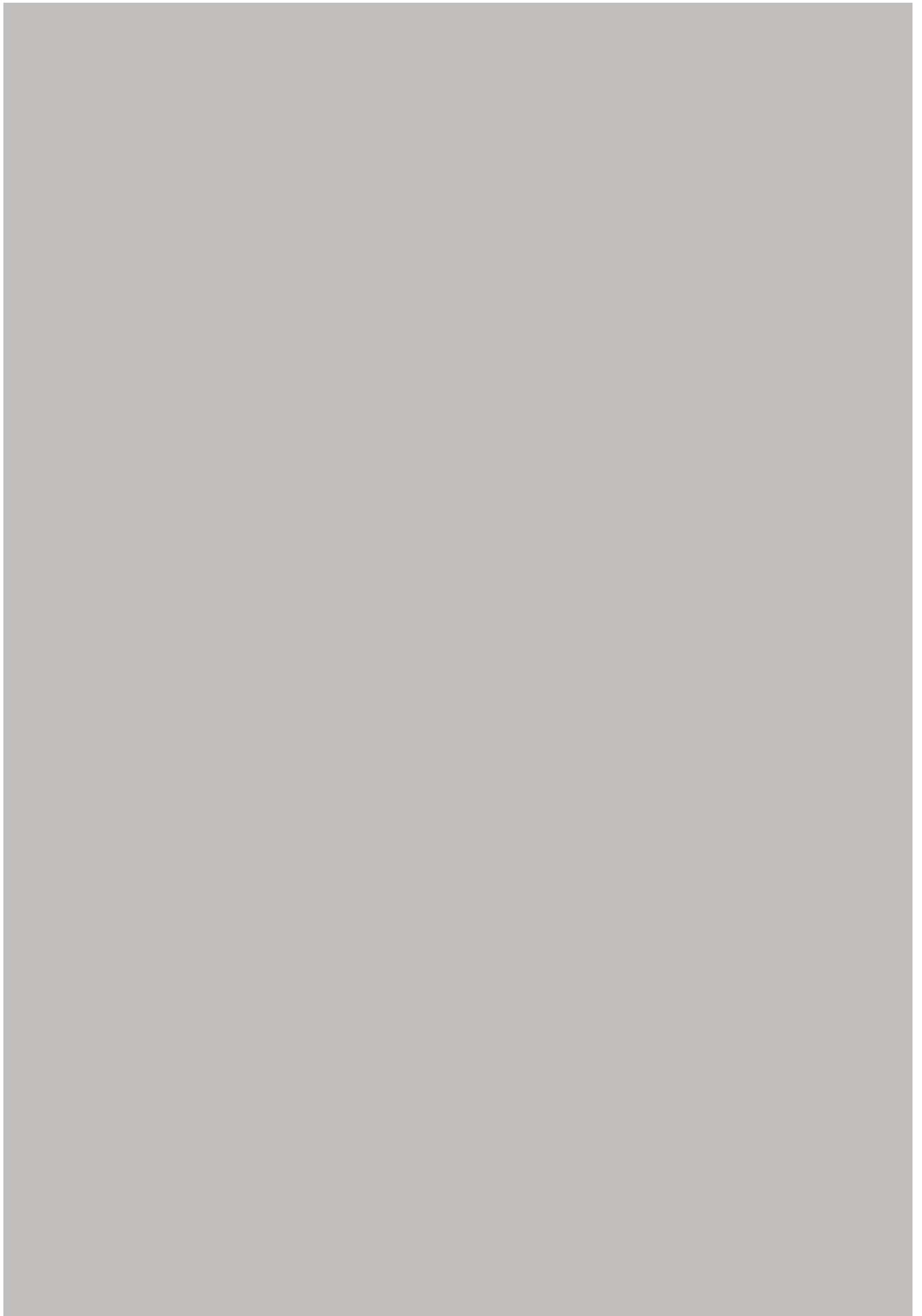
The key is to be proactive, ask questions, and explore all available options. Many orthodontic offices offer free initial consultations where families can discuss financial arrangements and develop a personalized payment strategy that works for their specific situation.

While the financial aspect of pediatric orthodontic care can seem overwhelming, numerous resources and flexible options exist to help families manage these expenses. With careful planning and research, parents can provide their children with the dental care they need without breaking the bank.

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Insurance Coverage and Impact on Orthodontic Expenses

Traditional Insurance Coverage and Limitations for Orthodontic Treatments

Navigating the world of orthodontic insurance can feel like walking through a maze blindfolded. Most traditional dental insurance plans offer limited coverage for orthodontic treatments, which can be frustrating for patients seeking comprehensive care.

Typically, dental insurance plans provide some orthodontic benefits, but they often come with significant restrictions. Many policies cover only a percentage of orthodontic expenses, usually around 50%, with a lifetime maximum benefit that ranges from \$1,000 to \$2,500. This might sound helpful, but when you consider that full orthodontic treatment can cost between \$3,000 and \$8,000, the coverage falls short of addressing the total expense.

Age limitations are another common constraint. Many traditional insurance plans only cover orthodontic treatments for children and teenagers, typically up to age 18 or 19. Adults seeking orthodontic care often find themselves paying entirely out of pocket, which can be a substantial financial burden.

Pre-existing conditions and waiting periods further complicate insurance coverage. Some plans require a waiting period before orthodontic benefits become active, and they might exclude treatments already in progress when the policy is purchased.

Additionally, many insurance providers classify orthodontic work as an elective procedure, which means they view it as optional rather than medically necessary. This classification can

result in more limited coverage and higher out-of-pocket costs for patients.

Understanding these limitations is crucial for anyone considering orthodontic treatment. Patients should carefully review their insurance policy, ask detailed questions about coverage, and explore alternative financing options to manage the potential financial challenges associated with orthodontic care.

Payment Plan Options for Pediatric Orthodontic Care

Navigating the world of orthodontic treatment can be financially challenging, but many clinics now understand the importance of making dental care accessible through flexible monthly payment plan options. These innovative financing arrangements have transformed how patients approach potentially expensive orthodontic procedures.

Modern orthodontic practices recognize that not everyone can afford a large upfront payment for braces or other dental corrections. As a result, they've developed creative payment strategies that break down the total cost into manageable monthly installments. These plans typically allow patients to spread their treatment expenses over 12 to 24 months, making comprehensive dental care more attainable for families and individuals.

Some clinics partner with third-party financing companies to offer zero or low-interest payment plans, which can be a game-changer for those on tight budgets. These arrangements often require a modest down payment and then divide the remaining balance into consistent monthly contributions. The flexibility means patients can choose a payment schedule that aligns with their personal financial situation.

Additionally, many orthodontic offices now provide digital tools and online calculators to help patients estimate their monthly payments in advance. This transparency allows individuals to plan their finances more effectively and make informed decisions about their dental health.

For those concerned about affordability, these flexible payment options represent a significant breakthrough. They ensure that quality orthodontic care isn't limited to those with immediate financial resources, but becomes accessible to a broader range of patients seeking to improve their dental health and confidence.

Factors Influencing Orthodontic Treatment Costs

Healthcare Credit Cards and Specialized Medical Financing Solutions: Navigating Payment Options

In today's complex healthcare landscape, many patients find themselves struggling with unexpected medical expenses that can quickly become overwhelming. Healthcare credit cards and specialized medical financing solutions have emerged as practical tools to help individuals manage these financial challenges more effectively.

These innovative financial products are designed to provide flexible payment options for medical treatments, procedures, and healthcare services that might not be fully covered by traditional insurance. Unlike standard credit cards, healthcare-specific financing options often come with unique benefits tailored to medical expenses.

One of the most significant advantages of these specialized financing solutions is the ability to break down large medical bills into more manageable monthly payments. Many cards offer promotional periods with zero or low interest rates, giving patients breathing room to address their medical needs without immediate financial strain. This can be particularly helpful for elective procedures, dental work, vision care, or treatments that require upfront payment.

Patients appreciate the convenience and accessibility of these financing options. Many healthcare providers now partner directly with medical credit card companies, making it easier

to apply and get approved quickly. The application process is typically straightforward, with many options available for individuals with varying credit backgrounds.

However, it's crucial for consumers to carefully read the terms and conditions. While these financing solutions can be incredibly helpful, they also come with potential pitfalls. Interest rates can spike after promotional periods, and late payments can result in significant financial penalties.

Some key considerations include:

- Comparing interest rates and terms
- Understanding promotional period conditions
- Checking for any hidden fees
- Evaluating personal financial ability to repay

Healthcare credit cards and specialized medical financing solutions represent an important bridge between medical needs and financial capabilities. They offer patients more control and flexibility in managing healthcare expenses, ultimately helping individuals access necessary treatments without immediate financial stress.

As healthcare costs continue to rise, these financial tools will likely become increasingly important for patients seeking affordable and accessible medical care. Informed decision-making and careful financial planning remain essential in navigating these options effectively.

Comparing Different Orthodontic Practices and Their Pricing Strategies

When it comes to managing payments for significant purchases, consumers often find themselves weighing the pros and cons of upfront payment discounts against long-term installment strategies. This financial decision can have substantial implications for personal budgeting and overall financial health.

Upfront payment discounts offer an immediate benefit of reducing the total cost of a purchase. Many businesses provide incentives for customers who can pay the full amount at the beginning, such as percentage discounts or waived interest charges. This approach can be particularly attractive for those with available savings or who want to avoid ongoing financial commitments.

On the flip side, long-term installment strategies provide more flexibility for individuals with limited immediate cash flow. Breaking a large expense into manageable monthly payments can make significant purchases more accessible. This approach allows people to preserve their cash reserves and maintain financial breathing room while still acquiring needed goods or services.

However, installment plans aren't without drawbacks. They often come with interest charges that increase the total cost over time. Consumers must carefully calculate the long-term financial impact, comparing the convenience of spread-out payments against the additional expenses incurred through financing.

The best strategy depends on individual financial circumstances. Those with stable income and sufficient savings might benefit from upfront discounts, while others may find monthly installments more manageable. Careful consideration of personal budget, interest rates, and overall financial goals is crucial in making this decision.

Ultimately, there's no one-size-fits-all solution. The key is to analyze personal financial health, understand the specific terms of payment options, and choose a strategy that provides the most financial comfort and advantage.

Additional Fees and Potential Hidden Expenses in Orthodontic Treatment

Navigating the world of dental care costs can feel overwhelming, but dental savings plans and membership programs offer a beacon of hope for those looking to manage their oral health expenses. These alternative approaches to traditional dental insurance have gained popularity in recent years, providing patients with more flexible and affordable options.

Dental savings plans are like membership clubs for your teeth. For an annual fee, you gain access to discounted rates on various dental services. Unlike traditional insurance, these plans typically have no waiting periods, no annual limits, and no complicated claim forms. Imagine walking into a dentist's office and instantly saving 10-60% on procedures - that's the basic premise of these plans.

Membership programs often work directly with specific dental practices or networks. They can be particularly attractive for individuals who don't have traditional dental insurance or those looking to supplement their existing coverage. Some plans offer comprehensive packages that include routine cleanings, x-rays, and significant discounts on more complex treatments like root canals or crowns.

The beauty of these programs lies in their simplicity. For a predictable annual cost, patients can budget their dental expenses more effectively. Many people find these plans especially helpful for preventive care, which can ultimately reduce long-term dental health costs by catching issues early.

When considering a dental savings plan, it's crucial to read the fine print and compare different options. Look for plans that cover the specific services you need, have a wide network of participating dentists, and offer meaningful discounts. Some plans even include additional perks like telemedicine consultations or discounts on vision and prescription services.

While not a perfect solution for everyone, dental savings plans and membership programs represent an innovative approach to managing dental care costs. They bridge the gap for those who find traditional insurance too expensive or restrictive, offering a more flexible and accessible path to maintaining oral health.

As healthcare continues to evolve, these alternative payment options demonstrate how creative solutions can make essential medical services more attainable for everyone. Whether you're a freelancer, small business owner, or simply someone looking to save on dental care, these programs are worth exploring.

Navigating the world of tax benefits and health spending accounts can feel like walking through a financial maze, but with the right knowledge, you can make strategic decisions that benefit both your health and your wallet.

Health Spending Accounts (HSAs) offer a unique opportunity to set aside pre-tax dollars for medical expenses, essentially giving you a built-in discount on healthcare costs. By contributing to an HSA, you're not just saving money, but creating a financial cushion for unexpected medical needs. The beauty of these accounts is their triple tax advantage - contributions are tax-deductible, the money grows tax-free, and withdrawals for qualified medical expenses are also tax-free.

When considering contributions, it's important to understand the annual limits set by the IRS. For 2023, individuals can contribute up to \$3,850, while family plans allow up to \$7,750. If you're over 55, you can make an additional catch-up contribution of \$1,000, which is a nice bonus for those closer to retirement.

Payment plans and financing arrangements can complement your HSA strategy. Many healthcare providers now offer flexible payment options that can help manage larger medical expenses. Some even provide interest-free plans if you can commit to a consistent payment schedule.

The key is to be proactive. Don't wait until you're facing a medical bill to start planning. By strategically contributing to your HSA and understanding available financing options, you can create a robust financial safety net for your healthcare needs.

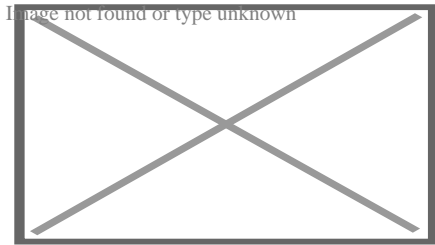
Remember, everyone's financial situation is unique. Consulting with a financial advisor can help you develop a personalized approach that maximizes your tax benefits and healthcare spending strategy.

About health professional

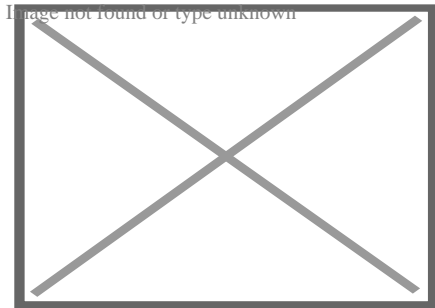
A **health professional**, **healthcare professional**, or **healthcare worker** (sometimes abbreviated **HCW**)[¹] is a provider of health care treatment and advice based on formal training and experience. The field includes those who work as a nurse, physician (such as family physician, internist, 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

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NY College of Health Professions massage therapy class

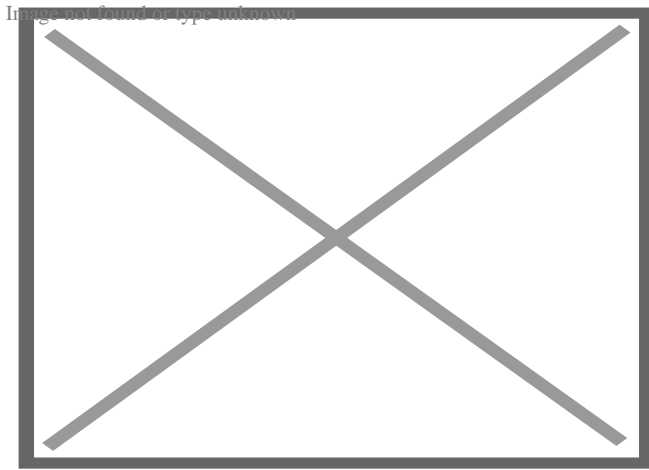


US Navy doctors deliver a healthy baby

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**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.^[2]

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.^[3] 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.^[citation 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.^[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.^[4] 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.^[5] 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".^[6] 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.^[7] 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.^[8]

Geriatrics

[edit]

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.^[9] 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.^[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.^[citation 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.^[10]

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

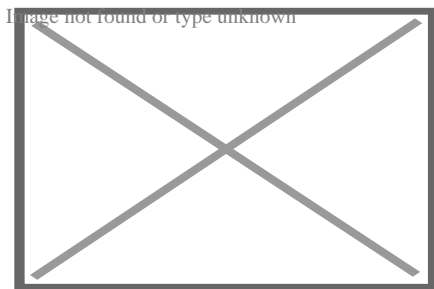
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Main article: Medical diagnosis

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.^[*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

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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. ^[*citation needed*]

Alternative medicine

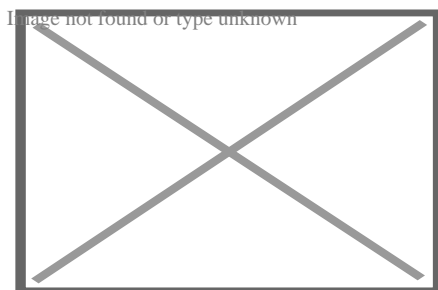
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In many societies, practitioners of alternative medicine have contact with a significant number of people, either as integrated within or remaining outside the formal health care system. These include practitioners in acupuncture, Ayurveda, herbalism, 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.[¹¹]

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.[¹²] Healthcare workers are also at risk for diseases that are contracted through extended contact with a patient, including scabies.[¹³] 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.[¹⁴][¹⁵] This risk can be mitigated with vaccination when there is a vaccine available, like with hepatitis B.[¹⁵] 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.[¹⁶]

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

[edit]

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.[¹⁷]

When hiring Health Care Personnel, the applicant should complete the following:[¹⁸] a TB risk assessment,[¹⁹] a TB symptom evaluation for at least those listed on the Signs & Symptoms page,[²⁰] a TB test in accordance with the guidelines for Testing for TB Infection,[²¹] and additional evaluation for TB disease as needed (e.g. chest x-ray for HCP with a positive TB test)[¹⁸] 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).[²¹] 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.[¹⁸]

The CDC has outlined further specifics on recommended testing for several scenarios.[²²] 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.[¹⁸] 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.[²³]

Psychosocial hazards

[edit]

Occupational stress and occupational burnout are highly prevalent among health professionals.[²⁴] 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.^[25] 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.^[26]

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.^[27]

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.^[28] Violent incidents typically occur during one-on-one care; being alone with patients increases healthcare workers' risk of assault.^[29] In the United States, healthcare workers experience 2/3 of nonfatal workplace violence incidents.^[28] 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.^[29]

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.^[31] 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.^[32]

Similarly, studies have also shown that following the pandemic, at least one in five healthcare professionals report symptoms of anxiety.^[33] Specifically, the aspect of "anxiety was assessed in 12 studies, with a pooled prevalence of 23.2%" following COVID.^[33] 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.^[34]
- 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.^[35] 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".^[5] 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.^[36]

An epidemiological study published in 2018 examined the hearing status of noise-exposed 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.^[37]

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

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.^{[39][40]}

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.^[41] There were 15.7 million health care professionals in the US as of 2011.^[36]

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.^[42]

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.^[43]

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.^[44] 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.^[45]

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.^[46]

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.^[47]

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.^[48]^[unreliable source] In Florida, practicing medicine without the appropriate license is a crime classified as a third degree felony,^[49] 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,^[49] 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

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External links

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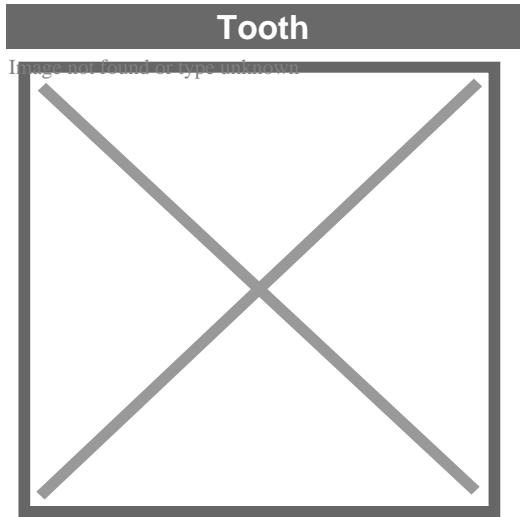
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-  Category

About tooth

This article is about teeth in general. For specifically human teeth, see Human tooth. For other uses, see Tooth (disambiguation).



A chimpanzee displaying his teeth

Details	
Identifiers	
Latin	<i>dens</i>
MeSH	D014070
FMA	12516

Anatomical terminology

[edit on Wikidata]

A **tooth** (pl.: **teeth**) is a hard, calcified structure found in the jaws (or mouths) of many vertebrates and used to break down food. Some animals, particularly carnivores and omnivores, also use teeth to help with capturing or wounding prey, tearing food, for defensive purposes, to intimidate other animals often including their own, or to carry prey or their young. The roots of teeth are covered by gums. Teeth are not made of bone, but rather of multiple tissues of varying density and hardness that originate from the outermost embryonic germ layer, the ectoderm.

The general structure of teeth is similar across the vertebrates, although there is considerable variation in their form and position. The teeth of mammals have deep roots, and this pattern is also found in some fish, and in crocodilians. In most teleost fish, however, the teeth are attached to the outer surface of the bone, while in lizards they are attached to the inner surface of the jaw by one side. In cartilaginous fish, such as sharks, the teeth are attached by tough ligaments to the hoops of cartilage that form the jaw.^[1]

Monophyodonts are animals that develop only one set of teeth, while diphyodonts grow an early set of deciduous teeth and a later set of permanent or "adult" teeth.

Polyphyodonts grow many sets of teeth. For example, sharks, grow a new set of teeth every two weeks to replace worn teeth. Most extant mammals including humans are diphyodonts, but there are exceptions including elephants, kangaroos, and manatees, all of which are polyphyodonts.

Rodent incisors grow and wear away continually through gnawing, which helps maintain relatively constant length. The industry of the beaver is due in part to this qualification. Some rodents, such as voles and guinea pigs (but not mice), as well as lagomorpha (rabbits, hares and pikas), have continuously growing molars in addition to incisors.^[2]^[3] Also, tusks (in tusked mammals) grow almost throughout life.^[4]

Teeth are not always attached to the jaw, as they are in mammals. In many reptiles and fish, teeth are attached to the palate or to the floor of the mouth, forming additional rows inside those on the jaws proper. Some teleosts even have teeth in the pharynx. While not true teeth in the usual sense, the dermal denticles of sharks are almost identical in structure and are likely to have the same evolutionary origin. Indeed, teeth appear to have first evolved in sharks, and are not found in the more primitive jawless fish – while lampreys do have tooth-like structures on the tongue, these are in fact, composed of keratin, not of dentine or enamel, and bear no relationship to true teeth.^[1] Though "modern" teeth-like structures with dentine and enamel have been found in late conodonts, they are now supposed to have evolved independently of later vertebrates' teeth.^[5]^[6]

Living amphibians typically have small teeth, or none at all, since they commonly feed only on soft foods. In reptiles, teeth are generally simple and conical in shape, although there is some variation between species, most notably the venom-injecting fangs of snakes. The pattern of incisors, canines, premolars and molars is found only in mammals, and to varying extents, in their evolutionary ancestors. The numbers of these types of teeth vary greatly between species; zoologists use a standardised dental formula to describe the precise pattern in any given group.^[1]

Etymology

[edit]

The word *tooth* comes from Proto-Germanic **tanþs*, derived from the Proto-Indo-European **h₂éǵʰsǵʰént-* which was composed of the root **h₂éǵʰsǵʰed-* 'to eat' plus the active

participle suffix **-nt*, therefore literally meaning 'that which eats'.^[7]

The irregular plural form *teeth* is the result of Germanic umlaut whereby vowels immediately preceding a high vocalic in the following syllable were raised. As the nominative plural ending of the Proto-Germanic consonant stems (to which **tanþs* belonged) was **-iz*, the root vowel in the plural form **tanþiz* (changed by this point to **tǣ*, via unrelated phonological processes) was raised to */œ̊/*, and later unrounded to */e̊/*, resulting in the **tǣ...þ/tǣ...œ̊* alternation attested from Old English. Cf. also Old English *bōc/bōc* 'book/books' and *mūs/mūs* 'mouse/mice', from Proto-Germanic **bōks/bōkiz* and **mūs/mūsiz* respectively.

Cognate with Latin *dēns*, Greek *ὀδόντος* (*odontos*), and Sanskrit *dāt*.

Origin

[edit]

Teeth are assumed to have evolved either from ectoderm denticles (scales, much like those on the skin of sharks) that folded and integrated into the mouth (called the "outside-in" theory), or from endoderm pharyngeal teeth (primarily formed in the pharynx of jawless vertebrates) (the "inside-out" theory). In addition, there is another theory stating that neural crest gene regulatory network, and neural crest-derived ectomesenchyme are the key to generate teeth (with any epithelium, either ectoderm or endoderm).^{[4][8]}

The genes governing tooth development in mammals are homologous to those involved in the development of fish scales.^[9] Study of a tooth plate of a fossil of the extinct fish *Romundina stellina* showed that the teeth and scales were made of the same tissues, also found in mammal teeth, lending support to the theory that teeth evolved as a modification of scales.^[10]

Mammals

[edit]

Main article: Mammal tooth

Teeth are among the most distinctive (and long-lasting) features of mammal species. Paleontologists use teeth to identify fossil species and determine their relationships. The shape of the animal's teeth are related to its diet. For example, plant matter is hard to digest, so herbivores have many molars for chewing and grinding. Carnivores, on the other hand, have canine teeth to kill prey and to tear meat.

Mammals, in general, are diphyodont, meaning that they develop two sets of teeth. In humans, the first set (the "baby", "milk", "primary" or "deciduous" set) normally starts to appear at about six months of age, although some babies are born with one or more

visible teeth, known as neonatal teeth. Normal tooth eruption at about six months is known as teething and can be painful. Kangaroos, elephants, and manatees are unusual among mammals because they are polyphyodonts.

Aardvark

[edit]

In aardvarks, teeth lack enamel and have many pulp tubules, hence the name of the order Tubulidentata.^[11]

Canines

[edit]

In dogs, the teeth are less likely than humans to form dental cavities because of the very high pH of dog saliva, which prevents enamel from demineralizing.^[12] Sometimes called cuspids, these teeth are shaped like points (cusps) and are used for tearing and grasping food.^[13]

Cetaceans

[edit]

Main article: Baleen

Like human teeth, whale teeth have polyp-like protrusions located on the root surface of the tooth. These polyps are made of cementum in both species, but in human teeth, the protrusions are located on the outside of the root, while in whales the nodule is located on the inside of the pulp chamber. While the roots of human teeth are made of cementum on the outer surface, whales have cementum on the entire surface of the tooth with a very small layer of enamel at the tip. This small enamel layer is only seen in older whales where the cementum has been worn away to show the underlying enamel.^[14]

The toothed whale is a parvorder of the cetaceans characterized by having teeth. The teeth differ considerably among the species. They may be numerous, with some dolphins bearing over 100 teeth in their jaws. On the other hand, the narwhals have a giant unicorn-like tusk, which is a tooth containing millions of sensory pathways and used for sensing during feeding, navigation, and mating. It is the most neurologically complex tooth known. Beaked whales are almost toothless, with only bizarre teeth found in males. These teeth may be used for feeding but also for demonstrating aggression and showmanship.

Primates

[edit]

Main articles: Human tooth and Dental anatomy

In humans (and most other primates), there are usually 20 primary (also "baby" or "milk") teeth, and later up to 32 permanent teeth. Four of these 32 may be third molars or wisdom teeth, although these are not present in all adults, and may be removed surgically later in life.^[15]

Among primary teeth, 10 of them are usually found in the maxilla (i.e. upper jaw) and the other 10 in the mandible (i.e. lower jaw). Among permanent teeth, 16 are found in the maxilla and the other 16 in the mandible. Most of the teeth have uniquely distinguishing features.

Horse

[edit]

Main article: Horse teeth

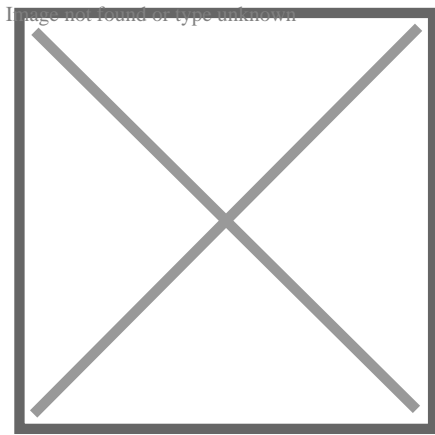
An adult horse has between 36 and 44 teeth. The enamel and dentin layers of horse teeth are intertwined.^[16] All horses have 12 premolars, 12 molars, and 12 incisors.^[17] Generally, all male equines also have four canine teeth (called tushes) between the molars and incisors. However, few female horses (less than 28%) have canines, and those that do usually have only one or two, which many times are only partially erupted.^[18] A few horses have one to four wolf teeth, which are vestigial premolars, with most of those having only one or two. They are equally common in male and female horses and much more likely to be on the upper jaw. If present these can cause problems as they can interfere with the horse's bit contact. Therefore, wolf teeth are commonly removed.^[17]

Horse teeth can be used to estimate the animal's age. Between birth and five years, age can be closely estimated by observing the eruption pattern on milk teeth and then permanent teeth. By age five, all permanent teeth have usually erupted. The horse is then said to have a "full" mouth. After the age of five, age can only be conjectured by studying the wear patterns on the incisors, shape, the angle at which the incisors meet, and other factors. The wear of teeth may also be affected by diet, natural abnormalities, and cribbing. Two horses of the same age may have different wear patterns.

A horse's incisors, premolars, and molars, once fully developed, continue to erupt as the grinding surface is worn down through chewing. A young adult horse will have teeth, which are 110–130 mm (4.5–5 inches) long, with the majority of the crown remaining below the gumline in the dental socket. The rest of the tooth will slowly emerge from the jaw, erupting about 3 mm (1⁄8 in) each year, as the horse ages. When the animal reaches old age, the crowns of the teeth are very short and the teeth are often lost altogether. Very old horses, if lacking molars, may need to have their fodder ground up and soaked in water to create a soft mush for them to eat in order to obtain adequate nutrition.

Proboscideans

[edit]



Section through the ivory tusk of a mammoth

Main article: Elephant ivory

Elephants' tusks are specialized incisors for digging food up and fighting. Some elephant teeth are similar to those in manatees, and elephants are believed to have undergone an aquatic phase in their evolution.

At birth, elephants have a total of 28 molar plate-like grinding teeth not including the tusks. These are organized into four sets of seven successively larger teeth which the elephant will slowly wear through during its lifetime of chewing rough plant material. Only four teeth are used for chewing at a given time, and as each tooth wears out, another tooth moves forward to take its place in a process similar to a conveyor belt. The last and largest of these teeth usually becomes exposed when the animal is around 40 years of age, and will often last for an additional 20 years. When the last of these teeth has fallen out, regardless of the elephant's age, the animal will no longer be able to chew food and will die of starvation.^[19]^[20]

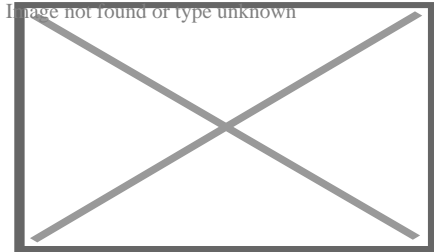
Rabbit

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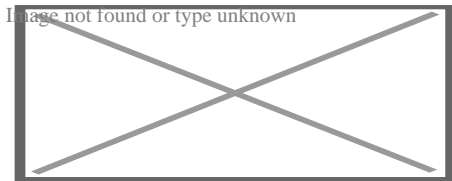
Rabbits and other lagomorphs usually shed their deciduous teeth before (or very shortly after) their birth, and are usually born with their permanent teeth.^[21] The teeth of rabbits complement their diet, which consists of a wide range of vegetation. Since many of the foods are abrasive enough to cause attrition, rabbit teeth grow continuously throughout life.^[22] Rabbits have a total of six incisors, three upper premolars, three upper molars, two lower premolars, and two lower molars on each side. There are no canines. Dental formula is $\frac{2.0.3.3}{1.0.2.3} = 28$. Three to four millimeters of the tooth is worn away by incisors

every week, whereas the cheek teeth require a month to wear away the same amount.[²³]

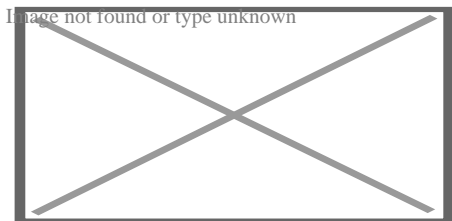
The incisors and cheek teeth of rabbits are called aradicular hypsodont teeth. This is sometimes referred to as an elodont dentition. These teeth grow or erupt continuously. The growth or eruption is held in balance by dental abrasion from chewing a diet high in fiber.



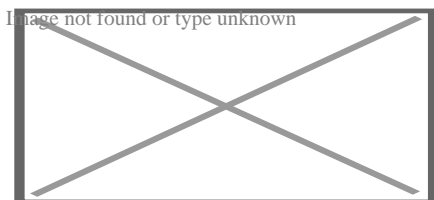
Buccal view of top incisor from *Rattus rattus*. Top incisor outlined in yellow. Molars circled in blue.



Buccal view of the lower incisor from the right dentary of a *Rattus rattus*



Lingual view of the lower incisor from the right dentary of a *Rattus rattus*



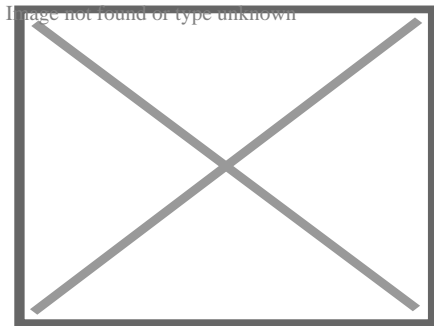
Midsagittal view of top incisor from *Rattus rattus*. Top incisor outlined in yellow. Molars circled in blue.

Rodents

[edit]

Rodents have upper and lower hypselodont incisors that can continuously grow enamel throughout its life without having properly formed roots.[²⁴] These teeth are also known as aradicular teeth, and unlike humans whose ameloblasts die after tooth development,

rodents continually produce enamel, they must wear down their teeth by gnawing on various materials.^[25] Enamel and dentin are produced by the enamel organ, and growth is dependent on the presence of stem cells, cellular amplification, and cellular maturation structures in the odontogenic region.^[26] Rodent incisors are used for cutting wood, biting through the skin of fruit, or for defense. This allows for the rate of wear and tooth growth to be at equilibrium.^[24] The microstructure of rodent incisor enamel has shown to be useful in studying the phylogeny and systematics of rodents because of its independent evolution from the other dental traits. The enamel on rodent incisors are composed of two layers: the inner portio interna (PI) with Hunter-Schreger bands (HSB) and an outer portio externa (PE) with radial enamel (RE).^[27] It usually involves the differential regulation of the epithelial stem cell niche in the tooth of two rodent species, such as guinea pigs.^{[28][29]}



Lingual view of top incisor from *Rattus rattus*. Top incisor outlined in yellow. Molars circled in blue.

The teeth have enamel on the outside and exposed dentin on the inside, so they self-sharpen during gnawing. On the other hand, continually growing molars are found in some rodent species, such as the sibling vole and the guinea pig.^{[28][29]} There is variation in the dentition of the rodents, but generally, rodents lack canines and premolars, and have a space between their incisors and molars, called the diastema region.

Manatee

[edit]

Manatees are polyphyodont with mandibular molars developing separately from the jaw and are encased in a bony shell separated by soft tissue.^{[30][31]}

Walrus

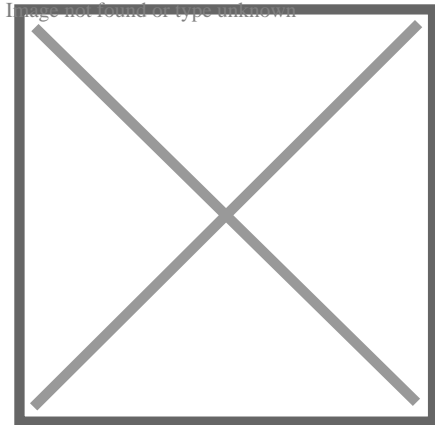
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Main article: Walrus ivory

Walrus tusks are canine teeth that grow continuously throughout life.^[32]

Fish

[edit]



Teeth of a great white shark

See also: Pharyngeal teeth and Shark tooth

Fish, such as sharks, may go through many teeth in their lifetime. The replacement of multiple teeth is known as polyphyodontia.

A class of prehistoric shark are called cladodonts for their strange forked teeth.

Unlike the continuous shedding of functional teeth seen in modern sharks,^[33]^[34] the majority of stem chondrichthyan lineages retained all tooth generations developed throughout the life of the animal.^[35] This replacement mechanism is exemplified by the tooth whorl-based dentitions of acanthodians,^[36] which include the oldest known toothed vertebrate, *Qianodus duplicis*^[37].

Amphibians

[edit]

All amphibians have pedicellate teeth, which are modified to be flexible due to connective tissue and uncalcified dentine that separates the crown from the base of the tooth.^[38]

Most amphibians exhibit teeth that have a slight attachment to the jaw or acrodont teeth. Acrodont teeth exhibit limited connection to the dentary and have little enervation.^[39] This is ideal for organisms who mostly use their teeth for grasping, but not for crushing and allows for rapid regeneration of teeth at a low energy cost. Teeth are usually lost in the course of feeding if the prey is struggling. Additionally, amphibians that undergo a metamorphosis develop bicuspid shaped teeth.^[40]

Reptiles

[edit]

The teeth of reptiles are replaced constantly throughout their lives. Crocodilian juveniles replace teeth with larger ones at a rate as high as one new tooth per socket every month. Once mature, tooth replacement rates can slow to two years and even longer. Overall, crocodilians may use 3,000 teeth from birth to death. New teeth are created within old teeth.^[41]

Birds

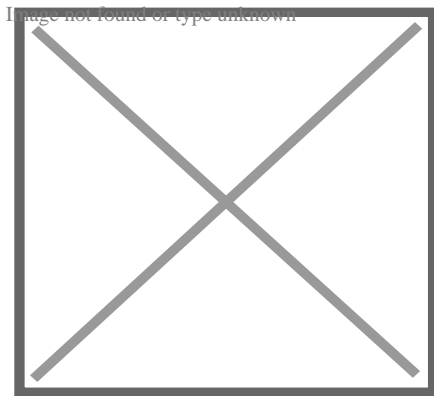
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Main article: Ichthyornis

A skull of Ichthyornis discovered in 2014 suggests that the beak of birds may have evolved from teeth to allow chicks to escape their shells earlier, and thus avoid predators and also to penetrate protective covers such as hard earth to access underlying food.^[42]^[43]

Invertebrates

[edit]



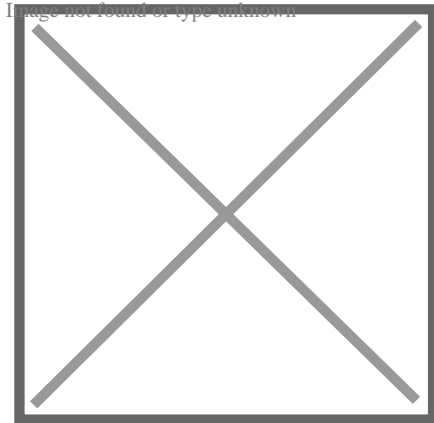
The European medicinal leech has three jaws with numerous sharp teeth which function like little saws for incising a host.

True teeth are unique to vertebrates,^[44] although many invertebrates have analogous structures often referred to as teeth. The organisms with the simplest genome bearing such tooth-like structures are perhaps the parasitic worms of the family Ancylostomatidae.^[45] For example, the hookworm *Necator americanus* has two dorsal and two ventral cutting plates or teeth around the anterior margin of the buccal capsule. It also has a pair of subdorsal and a pair of subventral teeth located close to the rear.^[46]

Historically, the European medicinal leech, another invertebrate parasite, has been used in medicine to remove blood from patients.^[47] They have three jaws (tripartite) that

resemble saws in both appearance and function, and on them are about 100 sharp teeth used to incise the host. The incision leaves a mark that is an inverted Y inside of a circle. After piercing the skin and injecting anticoagulants (hirudin) and anaesthetics, they suck out blood, consuming up to ten times their body weight in a single meal.^[48]

In some species of Bryozoa, the first part of the stomach forms a muscular gizzard lined with chitinous teeth that crush armoured prey such as diatoms. Wave-like peristaltic contractions then move the food through the stomach for digestion.^[49]



The limpet rasps algae from rocks using teeth with the strongest known tensile strength of any biological material.

Molluscs have a structure called a radula, which bears a ribbon of chitinous teeth. However, these teeth are histologically and developmentally different from vertebrate teeth and are unlikely to be homologous. For example, vertebrate teeth develop from a neural crest mesenchyme-derived dental papilla, and the neural crest is specific to vertebrates, as are tissues such as enamel.^[44]

The radula is used by molluscs for feeding and is sometimes compared rather inaccurately to a tongue. It is a minutely toothed, chitinous ribbon, typically used for scraping or cutting food before the food enters the oesophagus. The radula is unique to molluscs, and is found in every class of mollusc apart from bivalves.

Within the gastropods, the radula is used in feeding by both herbivorous and carnivorous snails and slugs. The arrangement of teeth (also known as denticles) on the radula ribbon varies considerably from one group to another as shown in the diagram on the left.

Predatory marine snails such as the Naticidae use the radula plus an acidic secretion to bore through the shell of other molluscs. Other predatory marine snails, such as the Conidae, use a specialized radula tooth as a poisoned harpoon. Predatory pulmonate land slugs, such as the ghost slug, use elongated razor-sharp teeth on the radula to seize and devour earthworms. Predatory cephalopods, such as squid, use the radula for cutting prey.

In most of the more ancient lineages of gastropods, the radula is used to graze by scraping diatoms and other microscopic algae off rock surfaces and other substrates. Limpets scrape algae from rocks using radula equipped with exceptionally hard rasping teeth.^[50] These teeth have the strongest known tensile strength of any biological material, outperforming spider silk.^[50] The mineral protein of the limpet teeth can withstand a tensile stress of 4.9 GPa, compared to 4 GPa of spider silk and 0.5 GPa of human teeth.^[51]

Fossilization and taphonomy

[edit]


Because teeth are very resistant, often preserved when bones are not,^[52] and reflect the diet of the host organism, they are very valuable to archaeologists and palaeontologists.^[53] Early fish such as the thelodonts had scales composed of dentine and an enamel-like compound, suggesting that the origin of teeth was from scales which were retained in the mouth. Fish as early as the late Cambrian had dentine in their exoskeletons, which may have functioned in defense or for sensing their environments.^[54] Dentine can be as hard as the rest of teeth and is composed of collagen fibres, reinforced with hydroxyapatite.^[54]

Though teeth are very resistant, they also can be brittle and highly susceptible to cracking.^[55] However, cracking of the tooth can be used as a diagnostic tool for predicting bite force. Additionally, enamel fractures can also give valuable insight into the diet and behaviour of archaeological and fossil samples.

Decalcification removes the enamel from teeth and leaves only the organic interior intact, which comprises dentine and cementine.^[56] Enamel is quickly decalcified in acids,^[57] perhaps by dissolution by plant acids or via diagenetic solutions, or in the stomachs of vertebrate predators.^[56] Enamel can be lost by abrasion or spalling,^[56] and is lost before dentine or bone are destroyed by the fossilisation process.^[57] In such a case, the 'skeleton' of the teeth would consist of the dentine, with a hollow pulp cavity.^[56] The organic part of dentine, conversely, is destroyed by alkalis.^[57]

See also

[edit]

-  [Medicine portal](#) Image and sound are both unknown
- [Animal tooth development](#)
- [Dragon's teeth \(mythology\)](#)

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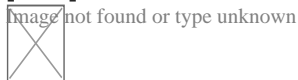
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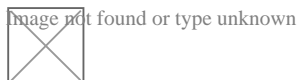
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Frequently Asked Questions

What are the typical payment options for childrens orthodontic treatment?

Most orthodontic offices offer flexible payment plans, including monthly installments, in-house financing, third-party financing through CareCredit, and sometimes sliding scale options based on family income.

How much does orthodontic treatment usually cost for children?

Costs typically range from \$3,000 to \$8,000 depending on the complexity of treatment, type of braces, and duration. Traditional metal braces are usually the most affordable, while ceramic or invisible aligners cost more.

Are there ways to reduce the financial burden of orthodontic treatment?

Parents can explore dental insurance coverage, flexible spending accounts (FSAs), health savings accounts (HSAs), orthodontic discount programs, and some offices offer sibling discounts or prepayment discounts.

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