orthodontic treatment

- **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
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- **About Us**

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

Navigating the Digital Smile: Teledentistry Regulations for Pediatric Orthodontic Care

In recent years, teledentistry has emerged as a groundbreaking approach to delivering dental care, particularly in pediatric orthodontics. As technology continues to reshape healthcare delivery, regulatory frameworks have become crucial in ensuring patient safety, quality of care, and ethical practice.

The landscape of teledentistry regulations is complex and evolving. Healthcare authorities recognize the potential of remote dental consultations while simultaneously maintaining stringent standards to protect young patients. Key regulatory considerations include patient privacy, diagnostic accuracy, and the limitations of virtual assessments.

State medical boards and dental associations have been actively developing comprehensive guidelines that address the unique challenges of digital orthodontic consultations. These regulations typically mandate secure communication platforms, robust patient verification processes, and clear protocols for when in-person examinations become necessary.

Kids may feel mild discomfort when braces are first applied **Child-friendly orthodontic solutions** dental braces.

Privacy protection stands at the forefront of these regulatory efforts. Platforms must comply with HIPAA regulations, ensuring that children's sensitive medical information remains confidential and securely transmitted. Encryption, secure data storage, and strict access controls are non-negotiable requirements for teledentistry providers.

Licensing presents another critical regulatory dimension. Orthodontists must be licensed in the patient's state of residence, creating a complex framework for digital healthcare delivery. This requirement ensures accountability and maintains professional standards across different jurisdictions.

While teledentistry offers tremendous potential for improving access to orthodontic care, regulations continue to emphasize that digital platforms cannot completely replace

traditional in-person examinations. Most guidelines recommend hybrid models where initial consultations and follow-ups can be conducted remotely, but critical diagnostic and treatment stages require physical assessments.

Insurance companies and healthcare providers are also developing specific frameworks to reimburse and validate teledentistry services. These evolving policies reflect a growing recognition of digital healthcare's importance, especially in reaching underserved pediatric populations.

As technology advances, regulatory bodies must remain adaptive. The goal is to create a balanced approach that leverages digital innovation while prioritizing patient safety and care quality. Continuous dialogue between technology developers, healthcare professionals, and regulatory agencies will be essential in refining these frameworks.

For parents and patients, understanding these regulations provides reassurance that teledentistry platforms are not a wild west of medical practice, but a carefully monitored and professionally regulated approach to modern healthcare delivery.

The future of pediatric orthodontic care lies in thoughtful integration of technology and robust regulatory oversight, ensuring that every digital smile is as safe and precise as its traditional counterpart.

Traditional Fee Structures: Per-Treatment Pricing Models

- **Additional Fees and Potential Hidden Expenses in Orthodontic Treatment**

The Current Legal and Regulatory Landscape for Teledentistry Platforms Offering Orthodontic Services

Teledentistry has emerged as a transformative technology in orthodontic care, but navigating its legal and regulatory framework remains complex and challenging. The current landscape is a patchwork of state-specific regulations, evolving federal guidelines, and ongoing legal interpretations that continue to shape how these platforms operate.

At the state level, regulations vary dramatically. Some states have embraced teledentistry with clear, progressive guidelines, while others maintain more restrictive approaches that significantly limit remote orthodontic consultations. This inconsistency creates a challenging environment for platforms seeking to provide nationwide services.

Key regulatory considerations include patient privacy, informed consent, and the standard of care. HIPAA compliance is paramount, requiring robust digital security measures to protect patient information. Additionally, platforms must demonstrate that remote diagnostics and treatment planning meet the same clinical standards as traditional in-person orthodontic care.

The licensing landscape adds another layer of complexity. Many states require practitioners to be licensed in the specific state where the patient resides, which can create significant operational challenges for teledentistry platforms hoping to offer nationwide services.

Professional organizations like the American Dental Association have been instrumental in developing preliminary guidelines, but the regulatory framework remains fluid. Emerging technologies continue to outpace existing regulations, creating a dynamic and sometimes uncertain legal environment.

Insurance reimbursement represents another critical aspect of the regulatory landscape. Many insurance providers are still adapting their policies to accommodate teledentistry services, with coverage varying widely across different states and providers.

Moving forward, platforms must remain agile, continuously monitoring regulatory changes and proactively adapting their business models. Collaboration with legal experts, state dental boards, and professional organizations will be crucial in navigating this complex regulatory terrain.

The future of teledentistry depends on striking a delicate balance between innovation, patient safety, and regulatory compliance. As technology advances and healthcare delivery models evolve, we can expect continued refinement of the legal and regulatory framework surrounding these platforms.

Insurance Coverage and Impact on Orthodontic Expenses

Patient Privacy and Data Protection in Online Orthodontic Consultation Platforms

In the rapidly evolving landscape of digital healthcare, teledentistry platforms have emerged as a revolutionary way to provide orthodontic consultations. However, with this technological advancement comes a critical responsibility: protecting patient privacy and ensuring robust data security.

The sensitive nature of medical information demands stringent protection mechanisms. Patients sharing personal health details, dental records, and facial images online are essentially entrusting platforms with their most intimate information. This trust must be safeguarded through comprehensive data protection strategies.

Regulatory frameworks like HIPAA in the United States and GDPR in Europe have established clear guidelines for handling patient data. These regulations mandate encryption of personal information, secure storage protocols, and strict access controls. Online orthodontic platforms

must implement multi-layered security systems that prevent unauthorized access and potential data breaches.

Key protective measures include end-to-end encryption for patient communications, anonymized data processing, and transparent consent mechanisms. Platforms must clearly communicate how patient data will be used, stored, and potentially shared with healthcare providers.

Moreover, these platforms need robust authentication processes to verify patient identities while maintaining anonymity. Biometric verification, two-factor authentication, and advanced cybersecurity protocols are essential in creating a secure digital consultation environment.

Patient trust is paramount. By demonstrating a commitment to privacy and implementing comprehensive data protection strategies, online orthodontic consultation platforms can revolutionize dental care while respecting individual privacy rights.

Payment Plan Options for Pediatric Orthodontic Care

Here's a human-like essay on the topic:

Licensing and Professional Certification Standards for Orthodontists Providing Remote Treatment Assessments

The landscape of dental healthcare is rapidly evolving with the emergence of teledentistry platforms, which present both exciting opportunities and complex regulatory challenges. Orthodontists seeking to provide remote treatment assessments must navigate a nuanced framework of professional standards and licensing requirements that ensure patient safety and quality care.

Currently, state dental boards are developing increasingly sophisticated guidelines for remote consultations and diagnostic processes. These standards typically require orthodontists to maintain the same level of professional competence and ethical practice as they would in traditional clinical settings. This means comprehensive documentation, secure patient data management, and clear communication protocols are essential.

Professional certification for teledentistry now demands specialized training beyond traditional orthodontic credentials. Practitioners must demonstrate proficiency in digital imaging interpretation, virtual patient screening techniques, and advanced telecommunication technologies. Many professional organizations are developing specific certification programs that validate an orthodontist's capability to conduct thorough remote assessments.

Key considerations include verifying patient identity, ensuring diagnostic image quality, and establishing clear referral pathways for cases requiring in-person examination. Licensing requirements increasingly emphasize the practitioner's ability to recognize technological limitations and maintain appropriate clinical boundaries in remote interactions.

As teledentistry continues to expand, we can expect more standardized national guidelines that balance innovation with rigorous professional standards, ultimately improving patient access to specialized orthodontic care while maintaining high-quality diagnostic practices.

Factors Influencing Orthodontic Treatment Costs

Informed Consent and Parental Authorization Protocols for Pediatric Teledentistry Orthodontic Services

In the rapidly evolving landscape of digital healthcare, teledentistry has emerged as a groundbreaking approach to providing orthodontic services for children. At the heart of this

innovative medical practice lies a critical framework of informed consent and parental authorization protocols that ensure both ethical and legal compliance.

The process begins with comprehensive communication between healthcare providers and parents or legal guardians. Unlike traditional in-person consultations, teledentistry requires an extra layer of transparency and detailed explanation about the virtual examination process. Parents must fully understand the capabilities and limitations of remote orthodontic assessments, including the potential need for follow-up in-person evaluations.

Specific consent forms tailored to pediatric teledentistry must clearly outline several key elements. These include the scope of the virtual examination, potential diagnostic limitations, privacy protections for digital medical records, and the specific technological platforms being utilized. Additionally, parents must provide explicit authorization for image and video capture, understanding how these digital records will be stored, shared, and protected.

Technological safeguards play a crucial role in these protocols. Secure, HIPAA-compliant platforms with robust encryption ensure that sensitive medical information remains confidential. Parents should receive detailed information about data protection measures, giving them confidence in the digital consultation process.

Age-appropriate consent is another critical consideration. For younger children, parental consent is comprehensive, while teenagers might be invited to participate in the consent process, acknowledging their growing autonomy in healthcare decisions.

Ultimately, these protocols represent a delicate balance between leveraging technological innovation and maintaining the highest standards of patient care and ethical medical practice. As teledentistry continues to evolve, these consent mechanisms will remain fundamental to building trust and ensuring the best possible outcomes for pediatric orthodontic care.

Comparing Different Orthodontic Practices and Their Pricing Strategies

Teledentistry has emerged as a transformative approach in modern dental healthcare, particularly in the realm of virtual orthodontic consultations. The technical and technological standards for secure virtual platforms are crucial in ensuring patient safety, data protection, and high-quality remote care.

At the core of these standards are robust cybersecurity protocols that protect sensitive patient information. Encryption technologies must meet HIPAA compliance requirements, ensuring that all patient data transmitted during virtual consultations remains confidential and secure. This includes end-to-end encryption for video consultations, secure file transfers, and protected digital imaging storage.

The technological infrastructure must support high-resolution imaging capabilities that allow orthodontists to conduct comprehensive remote assessments. This requires advanced camera technologies, standardized image capture protocols, and seamless integration of digital diagnostic tools. Platforms need to support multiple file formats and enable precise visual examination of dental structures.

User authentication and access control represent another critical component of these standards. Multi-factor authentication, secure login procedures, and role-based access controls help prevent unauthorized access to patient records and consultation platforms.

Interoperability is equally important, with platforms needing to integrate smoothly with existing electronic health record systems. This ensures comprehensive patient data management and continuity of care across different healthcare providers and systems.

Performance standards must also address real-time communication capabilities, minimizing latency and ensuring smooth video consultations. High-quality audio-visual technologies are essential for effective remote diagnostics and patient interactions.

As teledentistry continues to evolve, these technical standards will need continuous refinement to address emerging technologies, changing patient needs, and advancing cybersecurity landscapes. Regulatory bodies must remain adaptive and proactive in establishing guidelines that balance innovation with patient protection.

The future of orthodontic care increasingly depends on secure, reliable, and technologically advanced virtual platforms that can deliver professional, comprehensive care regardless of geographical limitations.

Additional Fees and Potential Hidden Expenses in Orthodontic Treatment

Teledentistry has emerged as a promising avenue in pediatric orthodontic care, offering innovative solutions for remote dental consultations and monitoring. However, its implementation is not without significant challenges and regulatory considerations.

The primary limitations of teledentistry in pediatric orthodontics revolve around the inherent complexity of comprehensive dental assessments. While digital platforms can facilitate initial screenings and follow-up consultations, they cannot entirely replace hands-on clinical examinations. Young patients require precise physical measurements, direct tissue evaluations, and nuanced assessments that digital interfaces may struggle to capture accurately.

Regulatory frameworks governing teledentistry platforms are still evolving, presenting a complex landscape for healthcare providers. Different jurisdictions maintain varying standards for remote dental consultations, creating potential legal and ethical uncertainties. Licensing requirements, patient privacy protections, and data security standards represent critical considerations that practitioners must navigate carefully.

Technical constraints also pose significant challenges. Not all families have consistent, high-quality internet access or sophisticated digital devices necessary for effective teledentistry interactions. Moreover, pediatric patients might find digital consultations less engaging or comfortable compared to traditional in-person appointments.

Despite these limitations, teledentistry offers meaningful advantages, particularly for patients in rural or underserved areas. It can provide initial assessments, ongoing monitoring, and preliminary orthodontic screenings that might otherwise be inaccessible.

Successful implementation requires a balanced approach that recognizes both the potential and the constraints of digital dental platforms. Healthcare providers must develop comprehensive protocols that integrate digital technologies with traditional clinical practices, ensuring patient safety and optimal care quality.

As technology continues to advance and regulatory frameworks mature, teledentistry's role in pediatric orthodontics will likely become more refined and sophisticated, offering increasingly nuanced and effective remote healthcare solutions.

Emerging Regulatory Frameworks and Future Developments in Digital Orthodontic Healthcare Delivery

The landscape of teledentistry is rapidly evolving, presenting both exciting opportunities and complex regulatory challenges. As digital healthcare platforms continue to transform how

orthodontic care is delivered, regulatory bodies are working to create comprehensive frameworks that balance innovation with patient safety.

Currently, the regulatory environment for teledentistry platforms is somewhat fragmented. Different jurisdictions have varying approaches to digital healthcare delivery, which creates a patchwork of guidelines that can be challenging for practitioners and technology developers to navigate. The primary concerns revolve around patient privacy, data security, and the quality of remote diagnostic and treatment processes.

Key developments are emerging that suggest a more standardized approach is on the horizon. Regulatory agencies are increasingly recognizing the potential of digital orthodontic platforms to improve access to care, particularly in underserved areas. This recognition is driving more nuanced and supportive regulatory frameworks that aim to facilitate innovation while maintaining rigorous patient protection standards.

Several critical areas are receiving particular attention. Data protection remains a paramount concern, with regulators pushing for robust encryption and secure patient information management. Additionally, there's growing emphasis on establishing clear guidelines for remote diagnostics, ensuring that digital assessments meet the same high standards as traditional in-person examinations.

Technology validation is another crucial aspect of these emerging frameworks. Regulators are developing more sophisticated mechanisms to assess the clinical effectiveness of digital orthodontic tools, creating pathways for innovative platforms to demonstrate their reliability and efficacy.

Looking forward, we can anticipate more integrated and flexible regulatory approaches. The goal is to create a balanced ecosystem that encourages technological innovation while protecting patient interests. This will likely involve closer collaboration between healthcare providers, technology companies, and regulatory bodies.

The future of teledentistry regulation is not about restriction, but about creating smart, adaptive frameworks that can keep pace with technological advancements. As digital healthcare continues to evolve, regulatory approaches will need to become more dynamic and responsive.

Practitioners and technology developers should stay informed about these emerging frameworks, actively participating in discussions and contributing to the development of responsible, patient-centered digital healthcare solutions.

About malocclusion

"Deep bite" and "Buck teeth" redirect here. For the village, see Deep Bight, Newfoundland and Labrador.

Malocclusion

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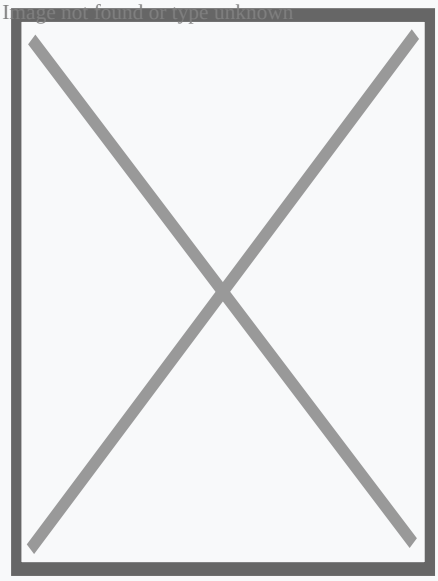

Malocclusion in 10-year-old girl

Specialty Dentistry Image not found or type unknown Edit this on Wikidata

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

In orthodontics, a **malocclusion** is a misalignment or incorrect relation between the teeth of the upper and lower dental arches when they approach each other as the jaws close. The English-language term dates from 1864;[1] Edward Angle (1855–1930), the "father of modern orthodontics",[2][3][*need quotation to verify*] popularised it. The word derives from *mal-* 'incorrect' and *occlusion* 'the manner in which opposing teeth meet'.

The malocclusion classification is based on the relationship of the mesiobuccal cusp of the maxillary first molar and the buccal groove of the mandibular first molar. If this molar relationship exists, then the teeth can align into normal occlusion. According to Angle, malocclusion is any deviation of the occlusion from the ideal.[4] However, assessment for malocclusion should also take into account aesthetics and the impact on functionality. If these aspects are acceptable to the patient despite meeting the formal definition of malocclusion, then treatment may not be necessary. It is estimated

that nearly 30% of the population have malocclusions that are categorised as severe and definitely benefit from orthodontic treatment.[5]

Causes

[edit]

The aetiology of malocclusion is somewhat contentious, however, simply put it is multifactorial, with influences being both genetic[6][*unreliable source?*] and environmental.[7] Malocclusion is already present in one of the Skhul and Qafzeh hominin fossils and other prehistoric human skulls.[8][9] There are three generally accepted causative factors of malocclusion:

- Skeletal factors – the size, shape and relative positions of the upper and lower jaws. Variations can be caused by environmental or behavioral factors such as muscles of mastication, nocturnal mouth breathing, and cleft lip and cleft palate.
- Muscle factors – the form and function of the muscles that surround the teeth. This could be impacted by habits such as finger sucking, nail biting, pacifier and tongue thrusting[10]
- Dental factors – size of the teeth in relation to the jaw, early loss of teeth could result in spacing or mesial migration causing crowding, abnormal eruption path or timings, extra teeth (supernumeraries), or too few teeth (hypodontia)

There is not one single cause of malocclusion, and when planning orthodontic treatment it is often helpful to consider the above factors and the impact they have played on malocclusion. These can also be influenced by oral habits and pressure resulting in malocclusion.[11][12]

Behavioral and dental factors

[edit]

In the active skeletal growth,[13] mouthbreathing, finger sucking, thumb sucking, pacifier sucking, onychophagia (nail biting), dermatophagia, pen biting, pencil biting, abnormal posture, deglutition disorders and other habits greatly influence the development of the face and dental arches.[14][15][16][17][18] Pacifier sucking habits are also correlated with otitis media.[19][20] Dental caries, periapical inflammation and tooth loss in the deciduous teeth can alter the correct permanent teeth eruptions.

Primary vs. secondary dentition

[edit]

Malocclusion can occur in primary and secondary dentition.

In primary dentition malocclusion is caused by:

- Underdevelopment of the dentoalvelor tissue.
- Over development of bones around the mouth.
- Cleft lip and palate.
- Overcrowding of teeth.
- Abnormal development and growth of teeth.

In secondary dentition malocclusion is caused by:

- Periodontal disease.
- Overeruption of teeth.[21]
- Premature and congenital loss of missing teeth.

Signs and symptoms

[edit]

Malocclusion is a common finding,[22][23] although it is not usually serious enough to require treatment. Those who have more severe malocclusions, which present as a part of craniofacial anomalies, may require orthodontic and sometimes surgical treatment (orthognathic surgery) to correct the problem.

The ultimate goal of orthodontic treatment is to achieve a stable, functional and aesthetic alignment of teeth which serves to better the patient's dental and total health.[24] The symptoms which arise as a result of malocclusion derive from a deficiency in one or more of these categories.[25]

The symptoms are as follows:

- Tooth decay (caries): misaligned teeth will make it more difficult to maintain oral hygiene. Children with poor oral hygiene and diet will be at an increased risk.
- Periodontal disease: irregular teeth would hinder the ability to clean teeth meaning poor plaque control. Additionally, if teeth are crowded, some may be more buccally or lingually placed, there will be reduced bone and periodontal support. Furthermore, in Class III malocclusions, mandibular anterior teeth are pushed

labially which contributes to gingival recession and weakens periodontal support.
- Trauma to anterior teeth: Those with an increased overjet are at an increased risk of trauma. A systematic review found that an overjet of greater than 3mm will double the risk of trauma.
- Masticatory function: people with anterior open bites, large increased & reverse overjet and hypodontia will find it more difficult to chew food.
- Speech impairment: a lisp is when the incisors cannot make contact, orthodontics can treat this. However, other forms of misaligned teeth will have little impact on speech and orthodontic treatment has little effect on fixing any problems.
- Tooth impaction: these can cause resorption of adjacent teeth and other pathologies for example a dentigerous cyst formation.
- Psychosocial wellbeing: malocclusions of teeth with poor aesthetics can have a significant effect on self-esteem.

Malocclusions may be coupled with skeletal disharmony of the face, where the relations between the upper and lower jaws are not appropriate. Such skeletal disharmonies often distort sufferer's face shape, severely affect aesthetics of the face, and may be coupled with mastication or speech problems. Most skeletal malocclusions can only be treated by orthognathic surgery.[*citation needed*]

Classification

[edit]

Depending on the sagittal relations of teeth and jaws, malocclusions can be divided mainly into three types according to Angle's classification system published 1899. However, there are also other conditions, e.g. *crowding of teeth*, not directly fitting into this classification.

Many authors have tried to modify or replace Angle's classification. This has resulted in many subtypes and new systems (see section below: *Review of Angle's system of classes*).

A deep bite (also known as a Type II Malocclusion) is a condition in which the upper teeth overlap the lower teeth, which can result in hard and soft tissue trauma, in addition to an effect on appearance.[26] It has been found to occur in 15–20% of the US population.[27]

An open bite is a condition characterised by a complete lack of overlap and occlusion between the upper and lower incisors.[28] In children, open bite can be caused by prolonged thumb sucking.[29] Patients often present with impaired speech and mastication.[30]

Overbites

[edit]

This is a vertical measurement of the degree of overlap between the maxillary incisors and the mandibular incisors. There are three features that are analysed in the classification of an overbite:

- Degree of overlap: edge to edge, reduced, average, increased
- Complete or incomplete: whether there is contact between the lower teeth and the opposing teeth/tissue (hard palate or gingivae) or not.
- Whether contact is traumatic or atraumatic

An average overbite is when the upper anterior teeth cover a third of the lower teeth. Covering less than this is described as ‘reduced’ and more than this is an ‘increased’ overbite. No overlap or contact is considered an ‘anterior open bite’.[25][31][32]

Angle's classification method

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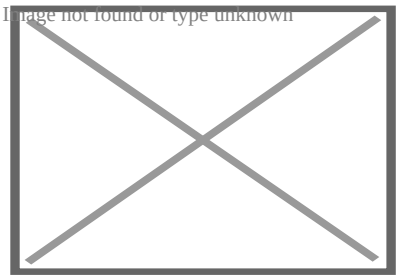

Class I with severe crowding and labially erupted canines

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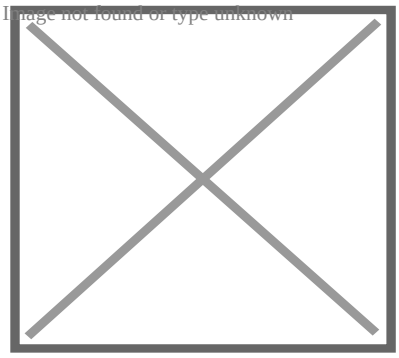

Class II molar relationship

Edward Angle, who is considered the father of modern orthodontics, was the first to classify malocclusion. He based his classifications on the relative position of the maxillary first molar.[33] According to Angle, the mesiobuccal cusp of the upper first molar should align with the buccal groove of the mandibular first molar. The teeth should all fit on a line of occlusion which, in the upper arch, is a smooth curve through the central fossae of the posterior teeth and cingulum of the canines and incisors, and in the lower arch, is a smooth curve through the buccal cusps of the posterior teeth and incisal edges of the anterior teeth. Any variations from this resulted in malocclusion types. It is also possible to have different classes of malocclusion on left and right sides.

- **Class I** (Neutrocclusion): Here the molar relationship of the occlusion is normal but the incorrect line of occlusion or as described for the maxillary first molar, but the other teeth have problems like spacing, crowding, over or under eruption, etc.
- **Class II** (Distocclusion (retrognathism, overjet, overbite)): In this situation, the mesiobuccal cusp of the upper first molar is not aligned with the mesiobuccal groove of the lower first molar. Instead it is anterior to it. Usually the mesiobuccal cusp rests in between the first mandibular molars and second premolars. There are two subtypes:
  - Class II Division 1: The molar relationships are like that of Class II and the anterior teeth are protruded.
  - Class II Division 2: The molar relationships are Class II but the central are retroclined and the lateral teeth are seen overlapping the centrals.
- **Class III**: (Mesiocclusion (prognathism, anterior crossbite, negative overjet, underbite)) In this case the upper molars are placed not in the mesiobuccal groove but posteriorly to it. The mesiobuccal cusp of the maxillary first molar lies posteriorly to the mesiobuccal groove of the mandibular first molar. Usually seen as when the lower front teeth are more prominent than the upper front teeth. In this case the patient very often has a large mandible or a short maxillary bone.

Review of Angle's system of classes and alternative systems

[edit]

A major disadvantage of Angle's system of classifying malocclusions is that it only considers two dimensions along a spatial axis in the sagittal plane in the terminal occlusion, but occlusion problems can be three-dimensional. It does not recognise deviations in other spatial axes, asymmetric deviations, functional faults and other therapy-related features.

Angle's classification system also lacks a theoretical basis; it is purely descriptive. Its much-discussed weaknesses include that it only considers static occlusion, it does not account for the development and causes (aetiology) of occlusion problems, and it disregards the proportions (or relationships in general) of teeth and face.[34] Thus, many attempts have been made to modify the Angle system or to replace it completely with a more efficient one,[35] but Angle's classification continues be popular mainly because of its simplicity and clarity.[*citation needed*]

Well-known modifications to Angle's classification date back to Martin Dewey (1915) and Benno Lischer (1912, 1933). Alternative systems have been suggested by, among others, Simon (1930, the first three-dimensional classification system), Jacob A. Salzmann (1950, with a classification system based on skeletal structures) and James L. Ackerman and William R. Proffit (1969).[36]

Incisor classification

[edit]

Besides the molar relationship, the British Standards Institute Classification also classifies malocclusion into incisor relationship and canine relationship.

- Class I: The lower incisor edges occlude with or lie immediately below the cingulum plateau of the upper central incisors
- Class II: The lower incisor edges lie posterior to the cingulum plateau of the upper incisors
    - Division 1 – the upper central incisors are proclined or of average inclination and there is an increase in overjet

    - Division 2 – The upper central incisors are retroclined. The overjet is usually minimal or may be increased.
- Class III: The lower incisor edges lie anterior to the cingulum plateau of the upper incisors. The overjet is reduced or reversed.

Canine relationship by Ricketts

[edit]

- Class I: Mesial slope of upper canine coincides with distal slope of lower canine
- Class II: Mesial slope of upper canine is ahead of distal slope of lower canine
- Class III: Mesial slope of upper canine is behind to distal slope of lower canine

Crowding of teeth

[edit]

Dental crowding is defined by the amount of space that would be required for the teeth to be in correct alignment. It is obtained in two ways: 1) by measuring the amount of space required and reducing this from calculating the space available via the width of the teeth, or 2) by measuring the degree of overlap of the teeth.

The following criterion is used:[25]

- 0-4mm = Mild crowding
- 4-8mm = Moderate crowding
- >8mm = Severe crowding

Causes

[edit]

Genetic (inheritance) factors, extra teeth, lost teeth, impacted teeth, or abnormally shaped teeth have been cited as causes of crowding. Ill-fitting dental fillings, crowns, appliances, retainers, or braces as well as misalignment of jaw fractures after a severe injury are also known to cause crowding.[26] Tumors of the mouth and jaw, thumb sucking, tongue thrusting, pacifier use beyond age three, and prolonged use of a bottle have also been identified.[26]

Lack of masticatory stress during development can cause tooth overcrowding.[37][38] Children who chewed a hard resinous gum for two hours a day showed increased facial growth.[37] Experiments in animals have shown similar results. In an experiment

on two groups of rock hyraxes fed hardened or softened versions of the same foods, the animals fed softer food had significantly narrower and shorter faces and thinner and shorter mandibles than animals fed hard food.[37][39][*failed verification*]

A 2016 review found that breastfeeding lowers the incidence of malocclusions developing later on in developing infants.[40]

During the transition to agriculture, the shape of the human mandible went through a series of changes. The mandible underwent a complex shape changes not matched by the teeth, leading to incongruity between the dental and mandibular form. These changes in human skulls may have been "driven by the decreasing bite forces required to chew the processed foods eaten once humans switched to growing different types of cereals, milking and herding animals about 10,000 years ago."[38][41]

Treatment

[edit]

Orthodontic management of the condition includes dental braces, lingual braces, clear aligners or palatal expanders.[42] Other treatments include the removal of one or more teeth and the repair of injured teeth. In some cases, surgery may be necessary.[43]

Treatment

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Malocclusion is often treated with orthodontics,[42] such as tooth extraction, clear aligners, or dental braces,[44] followed by growth modification in children or jaw surgery (orthognathic surgery) in adults. Surgical intervention is used only in rare occasions. This may include surgical reshaping to lengthen or shorten the jaw. Wires, plates, or screws may be used to secure the jaw bone, in a manner like the surgical stabilization of jaw fractures. Very few people have "perfect" alignment of their teeth with most problems being minor that do not require treatment.[37]

Crowding

[edit]

Crowding of the teeth is treated with orthodontics, often with tooth extraction, clear aligners, or dental braces, followed by growth modification in children or jaw surgery (orthognathic surgery) in adults. Surgery may be required on rare occasions. This may include surgical reshaping to lengthen or shorten the jaw (orthognathic surgery). Wires, plates, or screws may be used to secure the jaw bone, in a manner similar to the surgical stabilization of jaw fractures. Very few people have "perfect" alignment of their teeth. However, most problems are very minor and do not require treatment.[39]

Class I

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While treatment is not crucial in class I malocclusions, in severe cases of crowding can be an indication for intervention. Studies indicate that tooth extraction can have benefits to correcting malocclusion in individuals.[45][46] Further research is needed as reoccurring crowding has been examined in other clinical trials.[45][47]

Class II

[edit]

A few treatment options for class II malocclusions include:

1. Functional appliance which maintains the mandible in a postured position to influence both the orofacial musculature and dentoalveolar development prior to fixed appliance therapy. This is ideally done through pubertal growth in pre-adolescent children and the fixed appliance during permanent dentition .[48] Different types of removable appliances include Activator, Bionatar, Medium opening activator, Herbst, Frankel and twin block appliance with the twin block being the most widely used one.[49]
2. Growth modification through headgear to redirect maxillary growth
3. Orthodontic camouflage so that jaw discrepancy no longer apparent
4. Orthognathic surgery – sagittal split osteotomy mandibular advancement carried out when growth is complete where skeletal discrepancy is severe in anterior-posterior relationship or in vertical direction. Fixed appliance is required before, during and after surgery.
5. Upper Removable Appliance – limited role in contemporary treatment of increased overjets. Mostly used for very mild Class II, overjet due to incisor proclination, favourable overbite.

Class II Division 1

[edit]

Low- to moderate- quality evidence suggests that providing early orthodontic treatment for children with prominent upper front teeth (class II division 1) is more effective for reducing the incidence of incisal trauma than providing one course of orthodontic treatment in adolescence.[50] There do not appear to be any other advantages of providing early treatment when compared to late treatment.[50] Low-quality evidence suggests that, compared to no treatment, late treatment in adolescence with functional appliances is effective for reducing the prominence of upper front teeth.[50]

Class II Division 2

[edit]

Treatment can be undertaken using orthodontic treatments using dental braces.[51] While treatment is carried out, there is no evidence from clinical trials to recommend or discourage any type of orthodontic treatment in children.[51] A 2018 Cochrane systematic review anticipated that the evidence base supporting treatment approaches is not likely to improve occlusion due to the low prevalence of the condition and the ethical difficulties in recruiting people to participate in a randomized controlled trials for treating this condition.[51]

Class III

[edit]

The British Standard Institute (BSI) classify class III incisor relationship as the lower incisor edge lies anterior to the cingulum plateau of the upper incisors, with reduced or reversed over jet.[52] The skeletal facial deformity is characterized by mandibular prognathism, maxillary retrognathism or a combination of the two. This effects 3-8% of UK population with a higher incidence seen in Asia.[53]

One of the main reasons for correcting Class III malocclusion is aesthetics and function. This can have a psychological impact on the person with malocclusion resulting in speech and mastication problems as well. In mild class III cases, the patient is quite accepting of the aesthetics and the situation is monitored to observe the progression of skeletal growth.[54]

Maxillary and mandibular skeletal changes during prepubertal, pubertal and post pubertal stages show that class III malocclusion is established before the prepubertal stage.[55] One treatment option is the use of growth modification appliances such as the Chin Cap which has greatly improved the skeletal framework in the initial stages. However, majority of cases are shown to relapse into inherited class III malocclusion during the pubertal growth stage and when the appliance is removed after treatment.[55]

Another approach is to carry out orthognathic surgery, such as a bilateral sagittal split osteotomy (BSSO) which is indicated by horizontal mandibular excess. This involves surgically cutting through the mandible and moving the fragment forward or backwards for desired function and is supplemented with pre and post surgical orthodontics to ensure correct tooth relationship. Although the most common surgery of the mandible, it comes with several complications including: bleeding from inferior alveolar artery, unfavorable splits, condylar resorption, avascular necrosis and worsening of temporomandibular joint.[56]

Orthodontic camouflage can also be used in patients with mild skeletal discrepancies. This is a less invasive approach that uses orthodontic brackets to correct malocclusion and try to hide the skeletal discrepancy. Due to limitations of orthodontics, this option is more viable for patients who are not as concerned about the aesthetics of their facial appearance and are happy to address the malocclusion only, as well as avoiding the risks which come with orthognathic surgery. Cephalometric data can aid in the differentiation between the cases that benefit from ortho-surgical or orthodontic treatment only (camouflage); for instance, examining a large group of orthognathic patient with Class III malocclusions they had average ANB angle of -3.57° (95% CI, -3.92° to -3.21°). [57]

Deep bite

[edit]

The most common corrective treatments available are fixed or removal appliances (such as dental braces), which may or may not require surgical intervention. At this time there is no robust evidence that treatment will be successful.[51]

Open bite

[edit]

An open bite malocclusion is when the upper teeth don't overlap the lower teeth. When this malocclusion occurs at the front teeth it is known as anterior open bite. An open bite is difficult to treat due to multifactorial causes, with relapse being a major concern. This is particularly so for an anterior open bite.[58] Therefore, it is important to carry out a thorough initial assessment in order to obtain a diagnosis to tailor a suitable treatment plan.[58] It is important to take into consideration any habitual risk factors, as this is crucial for a successful outcome without relapse. Treatment approach includes behavior changes, appliances and surgery. Treatment for adults include a combination of extractions, fixed appliances, intermaxillary elastics and orthognathic surgery.[30] For children, orthodontics is usually used to compensate for continued growth. With children with mixed dentition, the malocclusion may resolve on its own as the permanent teeth erupt. Furthermore, should the malocclusion be caused by childhood habits such as digit, thumb or pacifier sucking, it may result in resolution as the habit is stopped. Habit deterrent appliances may be used to help in breaking digit and thumb sucking habits. Other treatment options for patients who are still growing include functional appliances and headgear appliances.

Tooth size discrepancy

[edit]

Identifying the presence of tooth size discrepancies between the maxillary and mandibular arches is an important component of correct orthodontic diagnosis and treatment planning.

To establish appropriate alignment and occlusion, the size of upper and lower front teeth, or upper and lower teeth in general, needs to be proportional. Inter-arch tooth size discrepancy (ITSD) is defined as a disproportion in the mesio-distal dimensions of teeth of opposing dental arches. The prevalence is clinically significant among orthodontic patients and has been reported to range from 17% to 30%.[59]

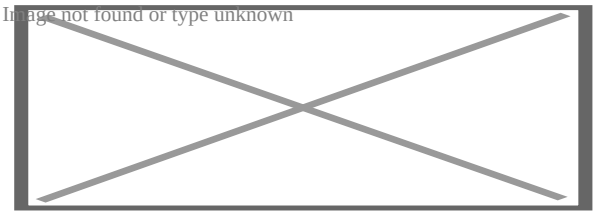
Identifying inter-arch tooth size discrepancy (ITSD) before treatment begins allows the practitioner to develop the treatment plan in a way that will take ITSD into account. ITSD corrective treatment may entail demanding reduction (interproximal wear), increase (crowns and resins), or elimination (extractions) of dental mass prior to treatment finalization.[60]

Several methods have been used to determine ITSD. Of these methods the one most commonly used is the Bolton analysis. Bolton developed a method to calculate the ratio between the mesiodistal width of maxillary and mandibular teeth and stated that a correct and harmonious occlusion is possible only with adequate proportionality of

tooth sizes.[60] Bolton's formula concludes that if in the anterior portion the ratio is less than 77.2% the lower teeth are too narrow, the upper teeth are too wide or there is a combination of both. If the ratio is higher than 77.2% either the lower teeth are too wide, the upper teeth are too narrow or there is a combination of both.[59]

Other conditions

[edit]
Further information: Open bite malocclusion



Open bite treatment after eight months of braces.

Other kinds of malocclusions can be due to or horizontal, vertical, or transverse skeletal discrepancies, including skeletal asymmetries.

Increased vertical growth causes a long facial profile and commonly leads to an open bite malocclusion, while decreased vertical facial growth causes a short facial profile and is commonly associated with a deep bite malocclusion. However, there are many other more common causes for open bites (such as tongue thrusting and thumb sucking) and likewise for deep bites.[61][62][63]

The upper or lower jaw can be overgrown (macrognathia) or undergrown (micrognathia).[62][61][63] It has been reported that patients with micrognathia are also affected by retrognathia (abnormal posterior positioning of the mandible or maxilla relative to the facial structure).[62] These patients are majorly predisposed to a class II malocclusion. Mandibular macrognathia results in prognathism and predisposes patients to a class III malocclusion.[64]

Most malocclusion studies to date have focused on Class III malocclusions. Genetic studies for Class II and Class I malocclusion are more rare. An example of hereditary mandibular prognathism can be seen amongst the Hapsburg Royal family where one third of the affected individuals with severe class III malocclusion had one parent with a similar phenotype [65]

The frequent presentation of dental malocclusions in patients with craniofacial birth defects also supports a strong genetic aetiology. About 150 genes are associated with craniofacial conditions presenting with malocclusions.[66] Micrognathia is a commonly recurring craniofacial birth defect appearing among multiple syndromes.

For patients with severe malocclusions, corrective jaw surgery or orthognathic surgery may be carried out as a part of overall treatment, which can be seen in about 5% of the general population.[62][61][63]

See also

[edit]

- Crossbite
- Elastics
- Facemask (orthodontics)
- Maximum intercuspation
- Mouth breathing
- Occlusion (dentistry)

References

[edit]

1. **^** *"malocclusion". Oxford English Dictionary (Online ed.). Oxford University Press.* (Subscription or participating institution membership required.)
2. **^** *Bell B (September 1965). "Paul G. Spencer". American Journal of Orthodontics.* ***51*** *(9): 693–694. doi:10.1016/0002-9416(65)90262-9. PMID 14334001.*
3. **^** *Gruenbaum T (2010). "Famous Figures in Dentistry". Mouth – JASDA.* ***30*** *(1): 18.*
4. **^** *Hurt MA (2012). "Weedon D. Weedon's Skin Pathology. 3rd ed. London: Churchill Livingstone Elsevier, 2010". Dermatology Practical & Conceptual.* ***2*** *(1): 79–82. doi:10.5826/dpc.0201a15. PMC 3997252.*
5. **^** *Borzabadi-Farahani, A (2011). "An Overview of Selected Orthodontic Treatment Need Indices". In Naretto, Silvano (ed.). Principles in Contemporary Orthodontics. IntechOpen Limited. pp. 215–236. doi:10.5772/19735. ISBN 978-953-307-687-4.*
6. **^** *"How genetics can affect your teeth". Orthodontics Australia. 2018-11-25. Retrieved 2020-11-16.*
7. **^** *Corruccini RS, Potter RH (August 1980). "Genetic analysis of occlusal variation in twins". American Journal of Orthodontics.* ***78*** *(2): 140–54. doi:10.1016/0002-9416(80)90056-1. PMID 6931485.*
8. **^** *Sarig, Rachel; Slon, Viviane; Abbas, Janan; May, Hila; Shpack, Nir; Vardimon, Alexander Dan; Hershkovitz, Israel (2013-11-20). "Malocclusion in Early Anatomically Modern Human: A Reflection on the Etiology of Modern Dental Misalignment". PLOS ONE.* ***8*** *(11): e80771. Bibcode:2013PLoSO...880771S. doi: 10.1371/journal.pone.0080771. ISSN 1932-6203. PMC 3835570. PMID 24278319.*
9. **^** *PajeviÃ„â€¡, Tina; Juloski, Jovana; GlišiÃ„â€¡, Branislav (2019-08-29). "Malocclusion from the prehistoric to the medieval times in Serbian population: Dentoalveolar and skeletal relationship comparisons in samples". Homo: Internationale Zeitschrift für die vergleichende Forschung am Menschen.* ***70*** *(1):*

31–43. doi:10.1127/homo/2019/1009. ISSN 1618-1301. PMID 31475289. S2CID 201203069.

10. **^** *Moimaz SA, Garbin AJ, Lima AM, Lolli LF, Saliba O, Garbin CA (August 2014). "Longitudinal study of habits leading to malocclusion development in childhood". BMC Oral Health. **14** (1): 96. doi:10.1186/1472-6831-14-96. PMC 4126276. PMID 25091288.*
11. **^** *Klein ET (1952). "Pressure Habits, Etiological Factors in Malocclusion". Am. J. Orthod. **38** (8): 569–587. doi:10.1016/0002-9416(52)90025-0.*
12. **^** *Graber TM. (1963). "The "Three m's": Muscles, Malformation and Malocclusion". Am. J. Orthod. **49** (6): 418–450. doi:10.1016/0002-9416(63)90167-2. hdl:2027.42/32220. S2CID 57626540.*
13. **^** *Björk A, Helm S (April 1967). "Prediction of the age of maximum puberal growth in body height" (PDF). The Angle Orthodontist. **37** (2): 134–43. PMID 4290545.*
14. **^** *Brucker M (1943). "Studies on the Incidence and Cause of Dental Defects in Children: IV. Malocclusion" (PDF). J Dent Res. **22** (4): 315–321. doi:10.1177/00220345430220041201. S2CID 71368994.*
15. **^** *Calisti LJ, Cohen MM, Fales MH (1960). "Correlation between malocclusion, oral habits, and socio-economic level of preschool children". Journal of Dental Research. **39** (3): 450–4. doi:10.1177/00220345600390030501. PMID 13806967. S2CID 39619434.*
16. **^** *Subtelny JD, Subtelny JD (October 1973). "Oral habits--studies in form, function, and therapy". The Angle Orthodontist. **43** (4): 349–83. PMID 4583311.*
17. **^** *Aznar T, Galán AF, Marín I, Domínguez A (May 2006). "Dental arch diameters and relationships to oral habits". The Angle Orthodontist. **76** (3): 441–5. PMID 16637724.*
18. **^** *Yamaguchi H, Sueishi K (May 2003). "Malocclusion associated with abnormal posture". The Bulletin of Tokyo Dental College. **44** (2): 43–54. doi: 10.2209/tdcpublication.44.43. PMID 12956088.*
19. **^** *Wellington M, Hall CB (February 2002). "Pacifier as a risk factor for acute otitis media". Pediatrics. **109** (2): 351–2, author reply 353. doi:10.1542/peds.109.2.351. PMID 11826228.*
20. **^** *Rovers MM, Numans ME, Langenbach E, Grobbee DE, Verheij TJ, Schilder AG (August 2008). "Is pacifier use a risk factor for acute otitis media? A dynamic cohort study". Family Practice. **25** (4): 233–6. doi:10.1093/fampra/cmn030. PMID 18562333.*
21. **^** *Hamish T (1990). Occlusion. Parkins, B. J. (2nd ed.). London: Wright. ISBN 978-0723620754. OCLC 21226656.*
22. **^** *Thilander B, Pena L, Infante C, Parada SS, de Mayorga C (April 2001). "Prevalence of malocclusion and orthodontic treatment need in children and adolescents in Bogota, Colombia. An epidemiological study related to different stages of dental development". European Journal of Orthodontics. **23** (2): 153–67. doi:10.1093/ejo/23.2.153. PMID 11398553.*

23. **^** *Borzabadi-Farahani A, Borzabadi-Farahani A, Eslamipour F (October 2009). "Malocclusion and occlusal traits in an urban Iranian population. An epidemiological study of 11- to 14-year-old children". European Journal of Orthodontics.* ***31*** *(5): 477–84. doi:10.1093/ejo/cjp031. PMID 19477970.*
24. **^** *"5 reasons you should see an orthodontist". Orthodontics Australia. 2017-09-27. Retrieved 2020-08-18.*
25. ^ ***a b c*** *Oliver RG (December 2001). "An Introduction to Orthodontics, 2nd edn". Journal of Orthodontics.* ***28*** *(4): 320. doi:10.1093/ortho/28.4.320.*
26. ^ ***a b c*** *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*** *(3): CD005972. doi:10.1002/14651858.cd005972.pub4. PMC 6491166. PMID 29390172.*
27. **^** *Brunelle JA, Bhat M, Lipton JA (February 1996). "Prevalence and distribution of selected occlusal characteristics in the US population, 1988-1991". Journal of Dental Research. 75 Spec No (2 Suppl): 706–13. doi:10.1177/00220345960750S10. PMID 8594094. S2CID 30447284.*
28. **^** *de Castilho LS, Abreu MH, Pires e Souza LG, Romualdo LT, Souza e Silva ME, Resende VL (January 2018). "Factors associated with anterior open bite in children with developmental disabilities". Special Care in Dentistry.* ***38*** *(1): 46–50. doi:10.1111/scd.12262. PMID 29278267. S2CID 42747680.*
29. **^** *Feres MF, Abreu LG, Insabralde NM, Almeida MR, Flores-Mir C (June 2016). "Effectiveness of the open bite treatment in growing children and adolescents. A systematic review". European Journal of Orthodontics.* ***38*** *(3): 237–50. doi:10.1093/ejo/cjv048. PMC 4914905. PMID 26136439.*
30. ^ ***a b*** *Cambiano AO, Janson G, Lorenzoni DC, Garib DG, Dávalos DT (2018). "Nonsurgical treatment and stability of an adult with a severe anterior open-bite malocclusion". Journal of Orthodontic Science.* ***7****: 2. doi:10.4103/jos.JOS_69_17. PMC 5952238. PMID 29765914.*
31. **^** *Houston, W. J. B. (1992-02-01). "Book Reviews". The European Journal of Orthodontics.* ***14*** *(1): 69. doi:10.1093/ejo/14.1.69.*
32. **^** *Hamdan AM, Lewis SM, Kelleher KE, Elhady SN, Lindauer SJ (November 2019). "Does overbite reduction affect smile esthetics?". The Angle Orthodontist.* ***89*** *(6): 847–854. doi:10.2319/030819-177.1. PMC 8109173. PMID 31306077.*
33. **^** *"Angle's Classification of Malocclusion". Archived from the original on 2008-02-13. Retrieved 2007-10-31.*
34. **^** Sunil Kumar (Ed.): Orthodontics. New Delhi 2008, 624 p., ISBN 978-81-312-1054-3, p. 127
35. **^** Sunil Kumar (Ed.): Orthodontics. New Delhi 2008, p. 123. A list of 18 approaches to modify or replace Angle's system is given here with further references at the end of the book.
36. **^** Gurkeerat Singh: Textbook of Orthodontics, p. 163-170, with further references on p. 174.

37. ^ ***a b c d*** *Lieberman, D (May 2004). "Effects of food processing on masticatory strain and craniofacial growth in a retrognathic face". Journal of Human Evolution.* ***46*** *(6): 655–77. doi:10.1016/s0047-2484(04)00051-x. PMID 15183669.*
38. ^ ***a b*** *Ingervall B, Bitsanis E (February 1987). "A pilot study of the effect of masticatory muscle training on facial growth in long-face children" (PDF). European Journal of Orthodontics.* ***9*** *(1): 15–23. doi:10.1093/ejo/9.1.15. PMID 3470182.*
39. ^ ***a b*** *Rosenberg J (2010-02-22). "Malocclusion of teeth". Medline Plus. Retrieved 2012-02-06.*
40. **^** Victora CG, Bahl R, Barros AJ, França GV, Horton S, Krasevec J, Murch S, Sankar MJ, Walker N, Rollins NC (January 2016). "Breastfeeding in the 21st century: epidemiology, mechanisms, and lifelong effect". Lancet. 387 (10017): 475–90. doi:10.1016/s0140-6736(15)01024-7. PMID 26869575.
41. **^** *Quaglio CL, de Freitas KM, de Freitas MR, Janson G, Henriques JF (June 2011). "Stability and relapse of maxillary anterior crowding treatment in class I and class II Division 1 malocclusions". American Journal of Orthodontics and Dentofacial Orthopedics.* ***139*** *(6): 768–74. doi:10.1016/j.ajodo.2009.10.044. PMID 21640883.*
42. ^ ***a b*** *"Dental Crowding: Causes and Treatment Options". Orthodontics Australia. 2020-06-29. Retrieved 2020-11-19.*
43. **^** *"Malocclusion of teeth: MedlinePlus Medical Encyclopedia". medlineplus.gov. Retrieved 2021-04-07.*
44. **^** *"Can Buck Teeth Be Fixed? Causes & Treatment Options". Orthodontics Australia. 2021-07-01. Retrieved 2021-10-11.*
45. ^ ***a b*** *Alam, MK (October 2018). "Treatment of Angle Class I malocclusion with severe crowding by extraction of four premolars: a case report". Bangladesh Journal of Medical Science.* ***17*** *(4): 683–687. doi:10.3329/bjms.v17i4.38339.*
46. **^** *Persson M, Persson EC, Skagius S (August 1989). "Long-term spontaneous changes following removal of all first premolars in Class I cases with crowding". European Journal of Orthodontics.* ***11*** *(3): 271–82. doi:10.1093/oxfordjournals.ejo.a035995. PMID 2792216.*
47. **^** *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): 19546–51. Bibcode:2011PNAS..10819546V. doi: 10.1073/pnas.1113050108. PMC 3241821. PMID 22106280.*
48. **^** *Nayak KU, Goyal V, Malviya N (October 2011). "Two-phase treatment of class II malocclusion in young growing patient". Contemporary Clinical Dentistry.* ***2*** *(4): 376–80. doi:10.4103/0976-237X.91808. PMC 3276872. PMID 22346172.*
49. **^** *"Treatment of class ii malocclusions". 2013-11-14.*
50. ^ ***a b c*** *Pinhasi R, Eshed V, von Cramon-Taubadel N (2015-02-04). "Incongruity between affinity patterns based on mandibular and lower dental dimensions following the transition to agriculture in the Near East, Anatolia and Europe".*

PLOS ONE. ***10*** *(2): e0117301. Bibcode:2015PLoSO..1017301P. doi: 10.1371/journal.pone.0117301. PMC 4317182. PMID 25651540.*

51. ^ ***a b c d*** *Batista KB, Thiruvenkatachari B, Harrison JE, O'Brien KD (March 2018). "Orthodontic treatment for prominent upper front teeth (Class II malocclusion) in children and adolescents". The Cochrane Database of Systematic Reviews.* ***2018*** *(3): CD003452. doi:10.1002/14651858.cd003452.pub4. PMC 6494411. PMID 29534303.*
52. ^ *CLASSIFICATION OF SKELETAL AND DENTAL MALOCCLUSION: REVISITED; Mageet, Adil Osman (2016). "Classification of Skeletal and Dental Malocclusion: Revisited". Stomatology Edu Journal.* ***3*** *(2): 205–211. doi: 10.25241/2016.3(2).11.*
53. ^ *Esthetics and biomechanics in orthodontics. Nanda, Ravindra,, Preceded by (work): Nanda, Ravindra. (Second ed.). St. Louis, Missouri. 2014-04-10. ISBN 978-0-323-22659-2. OCLC 880707123.*cite book: CS1 maint: location missing publisher (link) CS1 maint: others (link)
54. ^ *Eslami S, Faber J, Fateh A, Sheikholaemmeh F, Grassia V, Jamilian A (August 2018). "Treatment decision in adult patients with class III malocclusion: surgery versus orthodontics". Progress in Orthodontics.* ***19*** *(1): 28. doi:10.1186/s40510-018-0218-0. PMC 6070451. PMID 30069814.*
55. ^ ***a b*** *Uner O, Yüksel S, Uçüncü N (April 1995). "Long-term evaluation after chincap treatment". European Journal of Orthodontics.* ***17*** *(2): 135–41. doi:10.1093/ejo/17.2.135. PMID 7781722.*
56. ^ *Ravi MS, Shetty NK, Prasad RB (January 2012). "Orthodontics-surgical combination therapy for Class III skeletal malocclusion". Contemporary Clinical Dentistry.* ***3*** *(1): 78–82. doi:10.4103/0976-237X.94552. PMC 3341765. PMID 22557903.*
57. ^ *Borzabadi Farahani A, Olkun HK, Eslamian L, Eslamipour F (2024). "A retrospective investigation of orthognathic patients and functional needs". Australasian Orthodontic Journal.* ***40****: 111–120. doi:10.2478/aoj-2024-0013.*
58. ^ ***a b*** *Atsawasuwan P, Hohlt W, Evans CA (April 2015). "Nonsurgical approach to Class I open-bite malocclusion with extrusion mechanics: a 3-year retention case report". American Journal of Orthodontics and Dentofacial Orthopedics.* ***147*** *(4): 499–508. doi:10.1016/j.ajodo.2014.04.024. PMID 25836010.*
59. ^ ***a b*** *Grauer D, Heymann GC, Swift EJ (June 2012). "Clinical management of tooth size discrepancies". Journal of Esthetic and Restorative Dentistry.* ***24*** *(3): 155–9. doi:10.1111/j.1708-8240.2012.00520.x. PMID 22691075. S2CID 11482185.*
60. ^ ***a b*** *Cançado RH, Gonçalves Júnior W, Valarelli FP, Freitas KM, Crêspo JA (2015). "Association between Bolton discrepancy and Angle malocclusions". Brazilian Oral Research.* ***29****: 1–6. doi:10.1590/1807-3107BOR-2015.vol29.0116. PMID 26486769.*
61. ^ ***a b c*** *Harrington C, Gallagher JR, Borzabadi-Farahani A (July 2015). "A retrospective analysis of dentofacial deformities and orthognathic surgeries using*

the index of orthognathic functional treatment need (IOFTN)". International Journal of Pediatric Otorhinolaryngology. ***79*** *(7): 1063–6. doi:10.1016/j.ijporl.2015.04.027. PMID 25957779.*

62. ^ ***a b c d*** *Posnick JC (September 2013). "Definition and Prevalence of Dentofacial Deformities". Orthognatic Surgery: Principles and Practice. Amsterdam: Elsevier. pp. 61–68. doi:10.1016/B978-1-4557-2698-1.00003-4. ISBN 978-145572698-1.*
63. ^ ***a b c*** *Borzabadi-Farahani A, Eslamipour F, Shahmoradi M (June 2016). "Functional needs of subjects with dentofacial deformities: A study using the index of orthognathic functional treatment need (IOFTN)". Journal of Plastic, Reconstructive & Aesthetic Surgery.* ***69*** *(6): 796–801. doi:10.1016/j.bjps.2016.03.008. PMID 27068664.*
64. ^ *Purkait, S (2011). Essentials of Oral Pathology 4th Edition.*
65. ^ *Joshi N, Hamdan AM, Fakhouri WD (December 2014). "Skeletal malocclusion: a developmental disorder with a life-long morbidity". Journal of Clinical Medicine Research.* ***6*** *(6): 399–408. doi:10.14740/jocmr1905w. PMC 4169080. PMID 25247012.*
66. ^ *Moreno Uribe LM, Miller SF (April 2015). "Genetics of the dentofacial variation in human malocclusion". Orthodontics & Craniofacial Research. 18 Suppl 1 (S1): 91–9. doi:10.1111/ocr.12083. PMC 4418210. PMID 25865537.*

Further reading

[edit]

- Peter S. Ungar, "The Trouble with Teeth: Our teeth are crowded, crooked and riddled with cavities. It hasn't always been this way", *Scientific American*, vol. 322, no. 4 (April 2020), pp. 44–49. "Our teeth [...] evolved over hundreds of millions of years to be incredibly strong and to align precisely for efficient chewing. [...] Our dental disorders largely stem from a shift in the oral environment caused by the introduction of softer, more sugary foods than the ones our ancestors typically ate."

External links

[edit]

Classification	○ **ICD-10**: K07.3, K07.4, K07.5, D K07.6 ○ **ICD-9-CM**: 524.4 ○ **MeSH**: D008310

Image not found or type unknown

Wikimedia Commons has media related to ***Malocclusion***.

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Orthodontics

Diagnosis	○ Bolton analysis ○ Cephalometric analysis ○ Cephalometry ○ Dentition analysis ○ Failure of eruption of teeth ○ Little's Irregularity Index ○ Malocclusion ○ Scissor bite ○ Standard anatomical position ○ Tooth ankylosis ○ Tongue thrust
Conditions	○ Overbite ○ Overjet ○ Open bite ○ Crossbite ○ Dental crowding ○ Dental spacing ○ Bimaxillary Protrusion ○ Prognathism ○ Retrognathism ○ Maxillary hypoplasia ○ Condylar hyperplasia ○ Overeruption ○ Mouth breathing ○ Temperomandibular dysfunction

Appliances	○ ACCO appliance ○ Archwire ○ Activator appliance ○ Braces ○ Damon system ○ Elastics ○ Frankel appliance ○ Invisalign ○ Lingual arch ○ Lip bumper ○ Herbst Appliance ○ List of orthodontic functional 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
Procedures	○ Anchorage (orthodontics) ○ Cantilever mechanics ○ Fiberotomy ○ Interproximal reduction ○ Intrusion (orthodontics) ○ Molar distalization ○ SARPE ○ Serial extraction
Materials	○ Beta-titanium ○ Nickel titanium ○ Stainless steel ○ TiMolium ○ Elgiloy ○ Ceramic ○ Composite ○ Dental elastics

Notable contributors	○ 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 ○ Juri Kurol ○ Craven Kurz ○ Benno 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

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

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Dental disease involving the jaw

General	○ Jaw abnormality ○ malocclusion ○ Orthodontics
Size	○ Gnathitis ○ Micrognathism ○ Maxillary hypoplasia
Maxilla and Mandible	○ Cherubism ○ Congenital epulis ○ Torus mandibularis ○ Torus palatinus

Other	○ Jaw and base of cranium
	  ○ Prognathism
	  ○ Retrognathism
	○ Dental arch
	  ○ Crossbite
	  ○ Overbite
	○ Temporomandibular joint disorder

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