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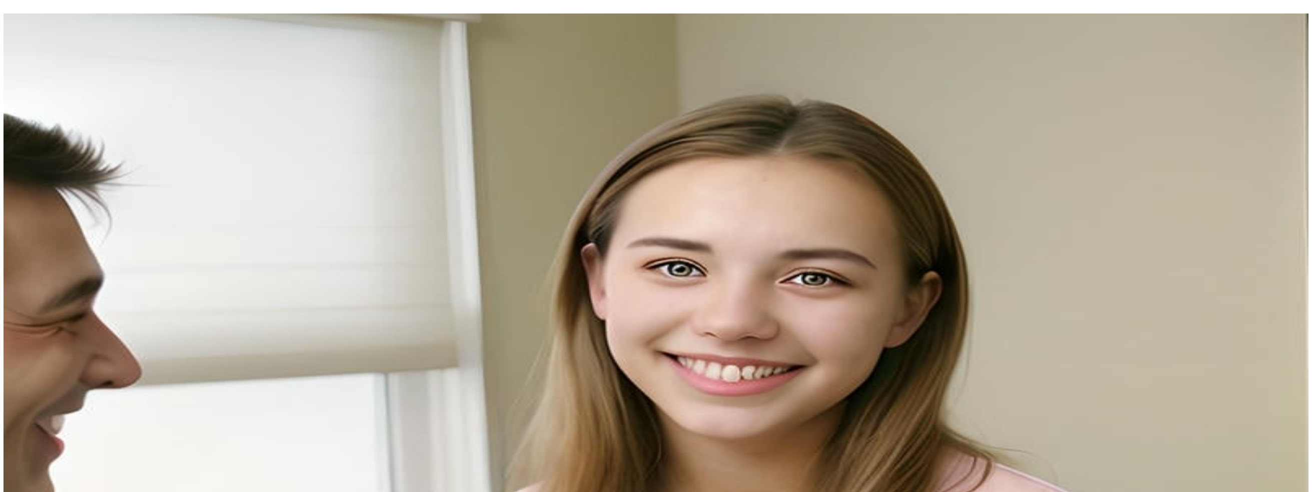

Light Cure Technologies and Bonding Efficiency

Understanding brackets: Types and functions in orthodontic treatment

Understanding brackets: Types and functions in orthodontic treatment

In orthodontics, light cure technologies play a crucial role in bonding brackets to teeth, ensuring they remain firmly attached throughout treatment. Over the years, various light sources have been developed to enhance bonding efficiency, each with its unique advantages and limitations.

Halogen lights were among the first to be used for this purpose. These traditional curing lights utilize a tungsten filament that produces light when heated by an electrical current. Jaw growth issues are easier to correct at an early age **Child-friendly orthodontic solutions** United States. Halogen lights are reliable and cost-effective but have some drawbacks. They generate significant heat, which can cause discomfort for patients and potential pulpal damage if not managed properly. Additionally, their light intensity degrades over time due to aging of the bulb, which can lead to inconsistent curing times and reduced bond strength.

With advancements in technology came LED (Light Emitting Diode) lights, which have become increasingly popular in orthodontic practices. LEDs produce light through a process called electroluminescence, converting electrical energy directly into light with minimal heat production. This results in a cooler curing process, enhancing patient comfort and reducing the risk of pulpal damage. Furthermore, LEDs maintain consistent light intensity over time, ensuring more predictable bond strengths. They also offer faster curing times compared to halogen lights, improving clinical efficiency. However, early generations of LED lights had narrow spectral ranges that sometimes resulted in inadequate polymerization of certain resins.

Plasma arc lights represent another innovation in light cure technology. These devices use a high-voltage electrical current to ionize gas within a small chamber, creating plasma that emits an intense beam of light. Plasma arc lights offer very high light intensities capable of rapidly curing adhesives-even those with deeper pigmentation or greater thicknesses-making them particularly advantageous for certain clinical situations requiring quick and strong bonds. Nevertheless, their high initial cost and potential safety concerns related to intense UV radiation exposure have limited their widespread adoption compared to LEDs.

When evaluating these technologies for bonding efficiency, several factors come into play: wavelength spectrum compatibility with photoinitiators within adhesive resins; adequate irradiance levels; appropriate exposure durations; and minimal heat generation during the curing process. Modern LED systems generally excel across these parameters when compared against older halogen units or even plasma arc systems due to their balance between efficacy and practicality within clinical settings without compromising patient safety or comfort considerations significantly influencing outcomes favorably towards better treatment results overall consistently observed clinically validated studies outlined previously mentioned attributes exemplified clearly underpinning superior performance reliably achieved daily routine usage standardly adopted contemporary orthodontic practices globally widespread acceptance acknowledging benefits realized overcoming past limitations encountered earlier iterations technological advancements continuously ongoing basis progressive evolution field dental materials sciences enhancing capabilities optimizing treatments further refinement expected foreseeable future continuing trend toward greater precision accuracy personalized care tailored individual patient needs ultimately improving overall quality life long lasting positive impact oral health wellbeing general population benefiting tremendously consequently forthcoming developments eagerly awaited anticipated keenly interested stakeholders practitioners alike alike

The process of fitting brackets on children's teeth —

In the realm of pediatric orthodontics, the efficacy of bonding agents is pivotal for successful treatment outcomes. The transition from traditional chemical cure adhesives to light cure technologies has brought about significant advancements, altering clinical practices and enhancing bonding efficiency. This shift is particularly crucial in pediatric orthodontics, where patient cooperation and comfort are paramount.

Traditional chemical cure adhesives have been a staple in orthodontic practices for decades. These adhesives rely on chemical reactions to harden and set, typically involving a two-part system that mixes resin with a catalyst. While effective, this process can be time-consuming and may lead to inconsistencies in bond strength due to variability in mixing ratios and environmental factors such as humidity and temperature. Additionally, these adhesives often require longer setting times which can be challenging for young patients who may find it difficult staying still during treatment sessions . This has led practitioners towards seeking more efficient alternatives leading them towards embracing light cure technologies .Light cure adhesives offer several advantages over their chemical counterparts especially pertinent within pediatric orthodontics . Light curable adhesives utilize photopolymerization where exposure visible blue light initiates hardening process making bond formation swift precise controllable . This rapidity significantly reduces chair time enhancing patient compliance since younger patients tend having shorter attention spans making extended procedures problematic . Moreover ,light cure adhesives exhibit superior bond strengths which results better retention rates brackets attachments reducing likelihood debond failures thereby minimizing need frequent reattachments adjustments .The precision offered by controlled exposure times also diminishes risk excess adhesive residue commonly associated traditional methods promoting better oral hygiene amongst young patients who might struggle maintaining thorough cleaning routines . Nevertheless ,it important acknowledge certain limitations exist when considering bond efficiency light cure systems primarily sensitivity ambient lighting premature polymerization potential heat generation during curing process although modern advancements LED technology mitigated these concerns largely . In conclusion ,while both chemical conventional light curable systems possess unique merits demands context pediatric orthodontic care distinctively favor latter owing its speed precision enhanced bond strengths promoting positive treatment experiences younger demographic . As research technology continue evolve expect further innovations refinements light cure technologies solidifying their role standard bearers modern orthodontic practice .

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How brackets contribute to the alignment and movement of teeth

In the realm of orthodontics, light cure technologies have emerged as a cornerstone for efficient and effective bonding procedures. This is especially relevant when it comes to treating children, where safety and effectiveness are paramount concerns. The process of bonding orthodontic brackets to teeth involves using a light-sensitive adhesive that hardens upon exposure to specific wavelengths of light, typically blue light.

The evaluation of these technologies encompasses several critical aspects. Firstly, safety is a primary consideration. Children's teeth and surrounding tissues are more sensitive compared to adults, making it essential to ensure that the light used does not cause any harm. Modern light cure units are designed with safety features such as automatic shut-off timers and controlled intensity levels to minimize risks such as thermal damage or eye injury.

Effectiveness is another crucial factor. Proper bonding ensures that brackets remain securely attached throughout treatment, which is vital for achieving desired orthodontic outcomes. Light cure technologies offer high bond strength, reducing the likelihood of bracket failure and subsequent need for re-bonding procedures. This not only saves time but also minimizes discomfort for young patients who may already be anxious about their treatment.

Additionally, advancements in light cure technologies have led to shorter curing times without compromising bond strength. This efficiency is particularly beneficial for children who may struggle with sitting still for extended periods during dental appointments. Reduced chair time can make the overall experience more comfortable and less stressful for both the child and the orthodontist.

Another aspect worth considering is the ease of use for orthodontists. User-friendly interfaces and ergonomic designs allow practitioners to focus more on patient care rather than technical complications. This streamlined approach ensures consistent results across different cases, further enhancing treatment reliability.

In conclusion, light cure technologies have significantly enhanced the safety and effectiveness of bonding procedures in pediatric orthodontics. By ensuring secure attachment, minimizing chair time, and prioritizing patient comfort, these innovations play a pivotal role in achieving successful treatment outcomes while maintaining high standards of care for young patients.

Benefits of early orthodontic intervention with brackets for kids

In the realm pediatric orthodontics Light Cure Technologies have become indispensable tools for bonding processes due their efficiency speed precision They facilitate quick setting times allowing clinicians secure brackets archwires rapidly minimize chair time young patients who may struggle sitting still extended periods However incorporating these technologies into clinical practice requires careful consideration several practical aspects ensure optimal results equipment longevity Here we explore some key factors clinicians should keep mind when using light-cure technologies bonding procedures

Firstly technique plays crucial role determining bonding efficiency duration cure With pediatric patients movement can be challenge hence developing swift accurate method applying adhesive positioning bracket critical Clinicians should aim direct light beam perpendicularly towards bracket ensure uniform exposure Children's teeth often have more prominent curvatures convexities making precise placement even more important Additionally maintaining slight distance between light tip tooth surface usually recommended preventing heat buildup potential damage pulpal tissues

Moreover understanding characteristics different types dental resins vital achieving excellent bonds Selecting suitable resin based on its viscosity working time intensity required curing pivotal Aspects like shade opacity also influence curing dynamics darker shades may necessitate longer exposures higher intensities Similarly knowing intricacies specific light-curing units at hand allows orthodontists adjust settings according manufacturer guidelines desired outcomes

Equipment maintenance another significant aspect impact overall performance lifespan light cure devices Regular cleaning sterilization protocol essential preventing cross contamination ensuring patient safety Additionally periodic checks calibration should conducted verify units functioning correctly emitting adequate intensity range Typically LED units preferred due longer lifespans lower heat generation compared halogen counterparts Nevertheless irrespective type technology employed consistent monitoring output quality imperative maintaining high clinical standards protecting investments equipment Replacement bulbs batteries should readily available minimizing downtime during procedures Furthermore staff training paramount guarantee proper usage care prolong life equipment foster better outcomes treatments Keep staff updated latest developments manufacturer recommendations encourage smooth workflow clinic promote best practices bonding techniques In conclusion while light cure technologies offer tremendous advantages pediatric orthodontic bonding their successful integration clinical settings hinges upon meticulous attention detail regarding both operational techniques equipment upkeep Through mindful consideration these factors clinicians can enhance bonding efficiency provide superior care their young patients ultimately fostering positive treatment experiences

Common issues and solutions related to brackets in pediatric orthodontics

Light cure technologies have revolutionized orthodontic treatment, particularly in bonding efficiency for children. These technologies utilize light-activated adhesives to secure brackets onto teeth, offering numerous advantages over traditional methods. Let's explore some case studies and clinical examples that demonstrate their successful use.

One notable case study involved a 10-year-old patient with severe crowding and an overbite. The orthodontist used a LED light cure unit to bond ceramic brackets onto the patient's teeth. The light cure technology allowed for precise and quick setting of the adhesive, reducing chair time significantly. The patient reported minimal discomfort, and the bonding efficiency was evident as none of the brackets failed during the course of treatment. The swift and comfortable procedure eased the child's anxiety, making subsequent visits more manageable.

Another clinical example showcased the use of light cure technologies in a complex case involving an 11-year-old with a crossbite and significant spacing issues. The orthodontist chose to use a halogen light cure device due to its deep penetration capabilities, ensuring a strong bond even in areas with challenging access. Despite the complexity of the case, the initial bonding process was completed efficiently in a single visit. The robust bonding allowed for effective force application via archwires, leading to successful tooth movement and correction of the malocclusion.

A comparative study highlighted the benefits of light cure technologies over chemical-cure systems in pediatric orthodontics. Two groups of patients aged 8 to 12 were treated, one using light cure adhesives and the other using conventional chemical-cure methods. The group treated with light cure technology experienced fewer bracket failures and required less re-bonding, demonstrating superior bonding efficiency. Additionally, orthodontists noted that light cure adhesives were easier to handle and less technique-sensitive, making them ideal for treating younger patients who may have difficulty remaining still during lengthy procedures.

In another instance, an orthodontist used a plasma arc light cure system for indirect bonding on a 9-year-old patient with multiple impacted teeth requiring surgical exposure followed by immediate bracket placement. The high intensity of plasma arc lights enabled rapid curing, minimizing moisture sensitivity-a critical factor when working near exposed tissues. This approach ensured strong initial bonds despite challenging oral conditions, facilitating effective tooth alignment post-surgery.

These case studies and clinical examples underscore the efficacy of light cure technologies in enhancing bonding efficiency during orthodontic treatment for children. By providing quicker setting times, stronger bonds, and greater ease of use, these technologies contribute significantly to improved outcomes and patient comfort in

The role of parental support during orthodontic treatment with brackets

In the ever-evolving field of pediatric orthodontics, light cure technologies play a pivotal role in enhancing bonding efficiency and overall treatment outcomes. As we look to the future, several trends and advancements promise to further revolutionize this area, ensuring more effective and patient-friendly experiences.

One of the most promising trends is the development of advanced LED (Light Emitting Diode) curing lights. These next-generation devices are becoming increasingly popular due to their superior performance compared to traditional halogen lights. LED lights offer a more focused wavelength spectrum, which allows for faster and more efficient curing of adhesive materials. This not only reduces chair time for young patients but also ensures stronger bonds, minimizing the risk of bracket failure.

Another significant advancement is the integration of digital technology with light curing processes. Smart curing lights equipped with sensors and connected to software applications can provide real-time feedback on curing effectiveness. These devices can monitor the intensity and duration of light exposure, ensuring optimal bonding conditions for each tooth surface. Such precision can lead to better adhesion and durability, crucial factors for successful orthodontic treatment in growing patients.

The emergence of biocompatible adhesives with enhanced photo-polymerization properties is another exciting development. These new materials are designed to respond more effectively to light curing techniques, resulting in stronger bonds with less shrinkage. This innovation not only improves bonding efficiency but also reduces post-operative sensitivity, making the experience more comfortable for young patients.

Furthermore, research into nanotechnology is opening new possibilities for bonding materials. Nanoparticles incorporated into adhesives can enhance mechanical properties and improve light penetration during curing. This technology holds promise for creating stronger bonds at lower energy levels, potentially reducing heat generation and discomfort during treatment sessions.

Looking ahead, personalized medicine could also influence light cure technologies in pediatric orthodontics. Customized treatment plans based on individual patient needs could include tailored light curing protocols that account for variations in tooth enamel composition or sensitivity levels. This approach could optimize bonding outcomes while minimizing adverse effects on young patients' dentition.

In summary, future trends and advancements in light cure technologies hold immense potential for enhancing bonding efficiency and overall outcomes in pediatric orthodontics. From advanced LED curing lights to digital integration and nanotechnology applications, these innovations promise more effective treatments tailored to young patients' unique needs. As research continues to uncover new possibilities, we can anticipate even greater strides toward achieving optimal bonding solutions that prioritize both efficacy and patient comfort.

About crossbite

Crossbite	
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Unilateral posterior crossbite	
Specialty	Orthodontics

In dentistry, **crossbite** is a form of malocclusion where a tooth (or teeth) has a more buccal or lingual position (that is, the tooth is either closer to the cheek or to the tongue) than its corresponding antagonist tooth in the upper or lower dental arch. In other words, crossbite is a lateral misalignment of the dental arches.[1][2]

Anterior crossbite

[edit]

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Class 1 with anterior crossbite

An anterior crossbite can be referred as negative overjet, and is typical of class III skeletal relations (prognathism).

Primary/mixed dentitions

[edit]

An anterior crossbite in a child with baby teeth or mixed dentition may happen due to either dental misalignment or skeletal misalignment. Dental causes may be due to displacement of one or two teeth, where skeletal causes involve either mandibular hyperplasia, maxillary hypoplasia or combination of both.

Dental crossbite

[edit]

An anterior crossbite due to dental component involves displacement of either maxillary central or lateral incisors lingual to their original erupting positions. This may happen due to delayed eruption of the primary teeth leading to permanent teeth moving lingual to their primary predecessors. This will lead to anterior crossbite where upon biting, upper teeth are behind the lower front teeth and may involve few or all frontal incisors. In this type of crossbite, the maxillary and mandibular proportions are normal to each other and to the cranial base. Another reason that may lead to a dental crossbite is crowding in the maxillary arch. Permanent teeth will tend to erupt lingual to the primary teeth in presence of crowding. Side-effects caused by dental crossbite can be increased recession on the buccal of lower incisors and higher chance of inflammation in the same area. Another term for an anterior crossbite due to dental interferences is *Pseudo Class III Crossbite or Malocclusion*.

Single tooth crossbite

[edit]

Single tooth crossbites can occur due to uneruption of a primary teeth in a timely manner which causes permanent tooth to erupt in a different eruption pattern which is lingual to the primary tooth.[3] Single tooth crossbites are often fixed by using a finger-spring based appliances.[4][5] This type of spring can be attached to a removable appliance which is used by patient every day to correct the tooth position.

Skeletal crossbite

[edit]

An anterior crossbite due to skeletal reasons will involve a deficient maxilla and a more hyperplastic or overgrown mandible. People with this type of crossbite will have dental compensation which involves proclined maxillary incisors and retroclined mandibular incisors. A proper diagnosis can be made by having a person bite into their centric relation will show mandibular incisors ahead of the maxillary incisors, which will show the skeletal discrepancy between the two jaws.[6]

Posterior crossbite

[edit]

Bjork defined posterior crossbite as a malocclusion where the buccal cusps of canine, premolar and molar of upper teeth occlude lingually to the buccal cusps of canine, premolar and molar of lower teeth.[7] Posterior crossbite is often correlated to a narrow maxilla and upper dental arch. A posterior crossbite can be unilateral, bilateral, single-tooth or entire segment crossbite. Posterior crossbite has been reported to occur between 7–23% of the population.[8][9] The most common type of posterior crossbite to occur is the unilateral crossbite which occurs in 80% to 97% of the posterior crossbite cases.[10][3] Posterior crossbites also occur most commonly in primary and mixed dentition. This type of crossbite usually presents with a *functional shift of the mandible towards the side of the crossbite*. Posterior crossbite can occur due to either skeletal, dental or functional abnormalities. One of the common reasons for development of posterior crossbite is the size difference between maxilla and mandible, where maxilla is smaller than mandible.[11] Posterior crossbite can result due to

- Upper Airway Obstruction where people with "adenoid faces" who have trouble breathing through their nose. They have an open bite malocclusion and present with development of posterior crossbite.[12]
- Prolong digit or suckling habits which can lead to constriction of maxilla posteriorly[13]
- Prolong pacifier use (beyond age 4)[13]

Connections with TMD

[edit]

Unilateral posterior crossbite

[edit]

Unilateral crossbite involves one side of the arch. The most common cause of unilateral crossbite is a narrow maxillary dental arch. This can happen due to habits such as digit sucking, prolonged use of pacifier or upper airway obstruction. Due to the discrepancy between the maxillary and mandibular arch, neuromuscular guidance of the mandible causes mandible to shift towards the side of the crossbite.[14] This is also known as Functional mandibular shift. This shift can become structural if left untreated for a long time during growth, leading to skeletal asymmetries. Unilateral crossbites can present with following features in a child

- Lower midline deviation[15] to the crossbite side
- Class 2 Subdivision relationships
- Temporomandibular disorders [16]

Treatment

[edit]

A child with posterior crossbite should be treated immediately if the child shifts their mandible on closing, which is often seen in a unilateral crossbite as mentioned above. The best age to treat a child with crossbite is in their mixed dentition when their palatal sutures have not fused to each other. Palatal expansion allows more space in an arch to relieve crowding and correct posterior crossbite. The correction can include any type of palatal expanders that will expand the palate which resolves the narrow constriction of the maxilla.[9] There are several therapies that can be used to correct a posterior crossbite: braces, 'Z' spring or cantilever spring, quad helix, removable plates, clear aligner therapy, or a Delaire mask. The correct therapy should be decided by the orthodontist depending on the type and severity of the crossbite.

One of the keys in diagnosing the anterior crossbite due to skeletal vs dental causes is diagnosing a CR–CO shift in a patient. An adolescent presenting with anterior crossbite may be positioning their mandible forward into centric occlusion (CO) due to the dental interferences. Thus finding their occlusion in centric relation (CR) is key in diagnosis. For anterior crossbite, if their CO matches their CR then the patient truly has a skeletal component to their crossbite. If the CR shows a less severe class 3 malocclusion or teeth not in anterior crossbite, this may mean that their anterior crossbite results due to dental interferences.[17]

Goal to treat unilateral crossbites should definitely include removal of occlusal interferences and elimination of the functional shift. Treating posterior crossbites early may help prevent the occurrence of Temporomandibular joint pathology.[18]

Unilateral crossbites can also be diagnosed and treated properly by using a Deprogramming splint. This splint has flat occlusal surface which causes the muscles to deprogram themselves and establish new sensory engrams. When the splint is removed, a proper centric relation bite can be diagnosed from the bite.[19]

Self-correction

[edit]

Literature states that very few crossbites tend to self-correct which often justify the treatment approach of correcting these bites as early as possible.[9] Only 0–9% of crossbites self-correct. Lindner et al. reported that 50% of crossbites were corrected in 76 four-year-old children.[20]

See also

[edit]

- List of palatal expanders
- Palatal expansion
- Malocclusion

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[edit]

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External links

[edit]

Classification	◦ **ICD-10**: K07.2 D ◦ **ICD-9-CM**: 524.27

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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

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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 ◦ Gnathitis
Size	◦ 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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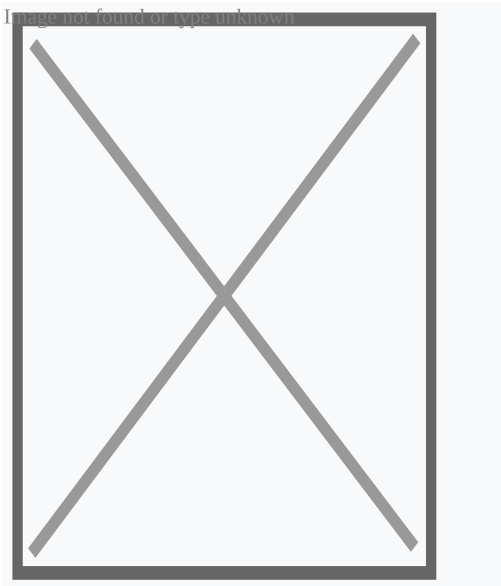
About malocclusion

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

Malocclusion



Malocclusion in 10-year-old girl

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

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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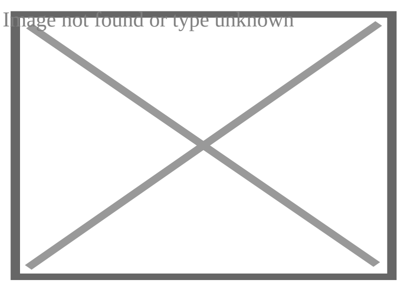
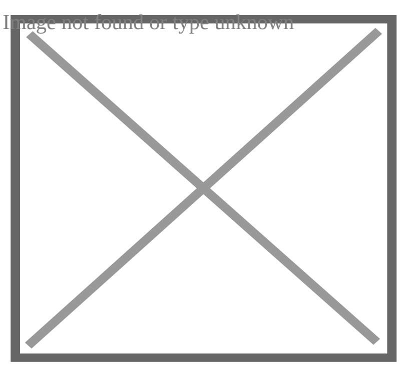


Class I with severe crowding and labially erupted canines



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 verificatio*

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

[edit]

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

[edit]

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]

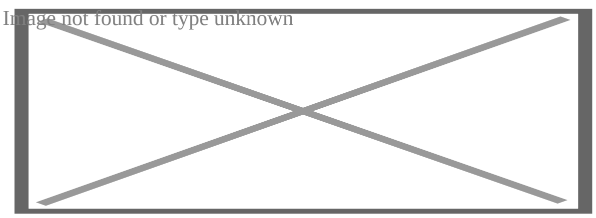
Identifying inter-arch tooth size discrepancy (ITSD) before treatment begins allows the practitioner to develop the treatment plan in a way that will take ITSD into account. ITSD corrective treatment may entail demanding reduction (interproximal wear), increase (crowns and resins), or elimination (extractions)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

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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, K07.6 ◦ **ICD-9-CM**: 524.4 ◦ **MeSH**: D008310	D

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

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 ◦ Gnathitis
Size	◦ Micrognathism ◦ Maxillary hypoplasia ◦ Cherubism
Maxilla and Mandible	◦ 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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