Accelerated Orthodontics

- **Innovative Approaches to Shorten Treatment Time**
  Innovative Approaches to Shorten Treatment Time The Role of Vibration Devices in Faster Tooth Movement Micro Osteoperforation and Its Effects on Treatment 3D Printing Techniques for Customized Appliances Benefits of Digital Impressions in Modern Orthodontics AI Assisted Treatment Planning for Precise Outcomes Remote Monitoring and Virtual Consultations Incorporating New Tools for Patient Compliance Practical Considerations of Accelerated Techniques Research Trends Shaping Future Orthodontic Practices Combining Traditional Methods With Cutting Edge Solutions Adapting to Technological Shifts in Orthodontic Care
- **Indications for Surgical Alignment of the Jaw**
  Indications for Surgical Alignment of the Jaw Steps in Preparing for Orthognathic Procedures Collaboration Between Orthodontists and Surgeons Recovery Factors That Affect Surgical Outcomes Managing Expectations During Corrective Jaw Treatment Potential Complications of Complex Jaw Adjustments Importance of Skeletal Analysis Before Surgery Combined Orthodontic and Surgical Treatment Timelines Role of Virtual Surgical Planning in Jaw Corrections Functional Improvements After Orthognathic Intervention Support and Care for Post Surgical Recovery Evaluating Long Term Benefits of Jaw Realignment
- **About Us**

Early orthodontic treatment plays a crucial role in preventing severe dental problems by ensuring proper jaw alignment and function. This proactive intervention is typically initiated in children between the ages of 7 and 10, when the jaw is still developing and more responsive to correction. By addressing jaw-related issues early, orthodontists can guide the growth of the jawbones, aligning them properly and creating a harmonious balance between the teeth, jaws, and facial features.

The long-term benefits of early jaw alignment are significant. It not only enhances facial symmetry but also improves overall oral health by reducing the risk of dental crowding, misaligned bites, and other issues that can lead to tooth decay and gum disease. Orthodontists specialize in correcting dental irregularities in kids **Braces for kids and teens** deciduous teeth. When teeth are properly aligned, it becomes easier to maintain good oral hygiene, reducing the likelihood of plaque buildup and related problems. Moreover, early treatment can prevent the need for more invasive procedures later in life, such as tooth extractions or surgical interventions.

Beyond the functional advantages, early orthodontic treatment also has a positive impact on a child's self-esteem and confidence. By correcting dental misalignments at an early stage, children can feel more comfortable with their appearance, which can significantly improve their social interactions and overall well-being. Early intervention also simplifies comprehensive orthodontic treatment later in life, often resulting in shorter treatment durations and more efficient outcomes.

In addition to these benefits, early jaw alignment can address skeletal imbalances, ensuring proper functioning of the jaw joints and preventing potential temporomandibular joint (TMJ) issues. This proactive care sets the foundation for a lifetime of healthy oral function, making it a vital step in a child's dental development. By investing in early orthodontic treatment, parents can ensure their child has a confident, functional smile that enhances their overall health and well-being.

Invisalign First is designed for children aged 6 to 10, using clear, removable aligners to

address early orthodontic needs, promoting proper jaw development and teeth alignment without traditional braces. —

- **Early Intervention with Invisalign First for Kids**
- **Invisalign First is designed for children aged 6 to 10, using clear, removable aligners to address early orthodontic needs, promoting proper jaw development and teeth alignment without traditional braces.**
- **The HealthyStart System**
- **This non-invasive approach targets the natural development of children's teeth and jaw, using soft dental appliances to align teeth and address breathing issues, reducing the need for more invasive treatments.**
- **Myobrace: A No-Braces Approach**
- **Myobrace offers a brace-free solution that corrects poor oral habits, guiding jaw and teeth alignment development in children, promoting natural growth and oral health.**
- **Comprehensive Orthodontic Solutions**

Proper jaw alignment is crucial for overall health and quality of life, particularly in children. When the jaws are properly aligned, it significantly enhances chewing, speaking, and breathing functions, which are essential for daily life. Improved chewing efficiency not only facilitates better digestion but also reduces the risk of dental issues such as uneven tooth wear and temporomandibular joint (TMJ) disorders. This, in effect, promotes better nutrition and reduces discomfort associated with misaligned jaws.

Proper jaw alignment also plays a pivotal role in enhancing speech clarity. Misalignments can impede the proper movement of the tongue and lips, leading to speech difficulties and articulation errors. By achieving optimal jaw alignment, individuals can communicate more effectively, leading to greater confidence in social interactions. Additionally, proper jaw alignment contributes to better breathing, which is especially important for addressing conditions like obstructive sleep apnea. This can lead to improved sleep quality and overall health, reducing the risk of cardiovascular problems and other systemic issues.

Furthermore, proper jaw alignment has aesthetic benefits, enhancing facial symmetry and balance. This can boost self-esteem and confidence, particularly in children, as they are more comfortable with their appearance. In essence, achieving proper jaw alignment is not just about correcting dental issues; it is about improving overall well-being and quality of life. It offers long-term stability in oral health by preventing future dental problems and ensuring that the jaws function optimally, which is essential for a healthier and more fulfilling life.

The HealthyStart System

Orthodontic treatment for jaw growth issues is a complex and beneficial process that involves using growth modification devices and functional appliances to guide jaw development. This early intervention is designed to prevent future complications such as crossbites and crowding, which can lead to more severe orthodontic problems if not properly aligned. By addressing jaw growth issues early on, patients can reduce the need for more complex procedures in the future.

Growth modification devices, such as expanders and headgear, are commonly used in early orthodontic treatment. Expanders work by gradually widening the upper jaw to create more space for each tooth to align properly, which is especially useful in treating crossbites and severe crowding. On the other hand, headgear helps control the shape of the upper jaw, guiding it to fit with the lower jaw, ensuring a proper bite and reducing the risk of future issues.

Functional appliances, such as the Activator, Bionator, Twin Block, and Herbst appliances, are designed to correct jaw discrepancies by shifting the jaws as they grow. These appliances can reposition the lower jaw forward or backward, improving the bite and overall facial profile. By using functional appliances, orthodontists can modify the jaw structure and promote proper alignment and function, preventing more complicated orthodontic problems in the future.

The long-term beneficial outcomes of using these appliances include not only a more aligned and healthy bite but also improved facial appearance and oral health. Correcting malocclusion can lead to a reduction in bruxism and temporomandibular joint (TMJ) disorders, which are associated with uneven pressure on the teeth and jaws. This even bite force can reduce chronic tooth pain, headaches, and difficulty in chewing.

In addition to these functional and health outcomes, early orthodontic treatment can also reduce the time needed for braces or other corrective devices in the future. It can lead to a more straightforward and effective treatment process, resulting in a better cosmetic outcome and improved overall oral health. By addressing jaw growth issues early, patients can prevent severe orthodontic complications and have a healthier, more aligned smile for the rest of their lives.

This non-invasive approach targets the natural

development of children's teeth and jaw, using soft dental appliances to align teeth and address breathing issues, reducing the need for more invasive treatments.

When it comes to jaw realignment, whether through orthodontic treatment or surgical procedures like orthognathic surgery, the long-term oral health benefits are significant. Early orthodontic treatment, for example, plays a crucial role in reducing the risk of tooth decay, gum disease, and other oral health issues. By ensuring that teeth are properly and efficiently realigning at a young age, it becomes easier for individuals to maintain good oral hygiene habits. This proactive approach helps prevent more serious dental problems from developing later in life.

Jaw alignment surgery, such as orthognathic or double jaw surgery, offers comprehensive benefits that also contribute to long-term oral health stability. These procedures not only correct severe jaw misalignments but also improve the overall functionality of the mouth. By enhancing bite function, chewing, and speaking abilities, individuals can maintain better oral hygiene, reducing the likelihood of plaque buildup and gum disease. Additionally, correcting misaligned jaws can prevent issues like teeth grinding and abnormal tooth wear, which are common complications associated with untreated jaw misalignments.

Furthermore, both early orthodontic treatment and jaw alignment surgery have aesthetic and functional impacts that can significantly improve an individual's quality of life. Enhanced facial symmetry and improved dental alignment boost self-confidence and contribute to a more fulfilling life. While these treatments require careful consideration and collaboration with dental professionals, the long-term benefits in oral health, functionality, and overall well-being make them transformative options for those seeking lasting improvements.

Myobrace: A No-Braces Approach

Jaw alignment, whether achieved through orthodontic treatment or surgical intervention, offers a multifaceted approach to enhancing both aesthetic and functional outcomes. Orthodontic treatments, such as braces or clear aligners, can realign teeth and jaws, significantly improving facial harmony and overall aesthetics. This realignment not only straightened teeth but also corrects bite issues like overbites and underbites, which can dramatically affect facial symmetry and profile aesthetics.

One of the most profound benefits of orthodontic jaw alignment is its impact on self-confidence. A straightened smile often leads to improved self-perception, boosting an individual's self-esteem and confidence. This newfound confidence can transform social interactions and personal relationships, as individuals feel more comfortable and outgoing in social settings.

In addition to aesthetic improvements, orthodontic treatment enhances dental functionality. Properly aligned teeth support the jaw, contributing to better chewing, speaking, and overall oral health. This alignment can also alleviate issues like uneven wear on teeth and reduce the risk of dental problems such as tooth decay and gum disease.

For more severe jaw misalignments, orthognathic surgery may be necessary. This surgical intervention not only improves facial aesthetics by correcting structural issues but also enhances oral function, allowing for better chewing and speaking abilities. It can address breathing difficulties, such as those associated with obstructive sleep apnea, and alleviate chronic jaw pain, leading to a more comfortable and pain-free life.

The long-term benefits of jaw realignment are profound. Whether achieved through orthodontics or surgery, the outcomes endure for a lifetime, making it a worthwhile investment in one's future well-being. Improved facial aesthetics and enhanced oral functionality

contribute to a better quality of life, boosting self-esteem and social confidence while ensuring long-term dental health and comfort.

Myobrace offers a brace-free solution that corrects poor oral habits, guiding jaw and teeth

alignment development in children, promoting natural growth and oral health.

When considering the long-term benefits of jaw realignment, one of the most significant outcomes is the reduction of pain and discomfort associated with conditions like temporomandibular joint (TMJ) disorders. Proper jaw alignment can significantly alleviate chronic pain, leading to a more comfortable and pain-free life for individuals, including children.

TMJ disorders often result from jaw misalignment, which can cause pain, clicking or popping sounds, difficulty in opening or closing the mouth, and even headaches. By correcting the jaw's position through realignment surgery or other treatments, individuals can experience relief from these chronic conditions. This not only enhances their quality of life but also contributes to improved overall well-being.

In children, addressing jaw misalignment at an appropriate medical intervention can be particularly crucial. It can help in preventing long-term complications such as dental issues, breathing difficulties, and even speech impediments. By ensuring proper jaw alignment, children can enjoy better oral function, improved facial aesthetics, and increased confidence as they go through their form of life.

While surgical interventions like orthognathic surgery are often considered for severe misalignments, non-surgical treatments such as orthodontics, physical therapy, and the use of oral appliances can also be very helpful in reducing pain and discomfort. These conservative approaches can effectively manage jaw-related issues, especially in cases where surgery is not necessary or is not an option.

In the long term, achieving proper jaw alignment can lead to a significant reduction in pain and discomfort, allowing individuals to engage more fully in daily life without the debilitating effects of chronic jaw pain. This, in turn, can enhance their overall quality of life, promoting better

health, improved self-esteem, and a more fulfilling life experience.

Comprehensive Orthodontic Solutions

Correcting jaw misalignments early in life can have a transformative impact on a child's long-term oral health. By addressing these issues through procedures like orthognathic surgery, children can enjoy significant benefits that last a lifetime. One of the most important advantages of early intervention is the prevention of future dental complications. Misaligned jaws can lead to a variety of problems, including abnormal tooth wear, difficulties in chewing and speaking, and increased strain on jaw joints and muscles. These issues can further lead to conditions such as TMJ disorders, which can cause pain and discomfort.

Early corrective jaw surgery, often used in cases of cleft lip and palate, not only improves facial symmetry and aesthetics but also enhances functional aspects like eating, speaking, and breathing. This surgery can correct overbite, underbite, and other jaw discrepancies, ensuring that the jaws work in harmony. By realigning the jaws, the distribution of biting forces is optimized, preventing uneven wear on teeth and reducing the risk of dental issues like tooth decay and gum disease.

Orthodontic treatment plays a crucial role in this process. By aligning teeth properly, orthodontics facilitates better oral hygiene practices, which are essential for maintaining long-term dental health. Straighter teeth are easier to clean, reducing the risk of plaque buildup and gum disease. Early orthodontic intervention can guide jaw growth and development, especially in children, ensuring that the jaws and teeth align correctly as they age. This proactive approach can simplify future treatments, sometimes eliminating the need for more complex surgical interventions later in life.

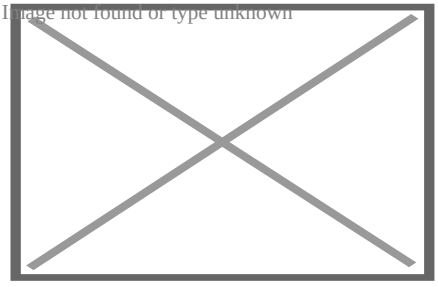
Moreover, correcting jaw misalignments can have a positive impact on a child's self-esteem and overall well-being. By improving facial aesthetics and enhancing functional abilities, children can feel more comfortable and self-confident in social settings. This confidence can translate into better social and academic outcomes, as children are more comfortable expressing themselves and are less self-conscious about their appearance.

In terms of long-term stability, procedures like double jaw surgery have been shown to provide a foundation for a lifetime of improved dental function. By repositioning the underlying bones and correcting skeletal irregularities, this surgery not only improves facial symmetry but also prevents future dental issues such as abnormal tooth wear and difficulties with chewing and speaking. The collaboration between orthodontic treatment and surgical intervention ensures that the teeth are properly aligned, both before and after surgery, leading to a stable occlusion and an aesthetically pleasing smile.

In short, correcting jaw misalignments early offers children a lifetime of benefits, from preventing dental complications to enhancing their overall quality of life. By addressing these issues at a young age, children can enjoy long-term stability in their oral health, improved functionality, and enhanced self-confidence, all of which contribute to a more positive and healthful life.

About jaw

This article is about the anatomical part. For the mountain, see The Jaw. For other uses, see Jaws (disambiguation) and Jawbone (disambiguation).



Human lower jaw viewed from the left

The **jaws** are a pair of opposable articulated structures at the entrance of the mouth, typically used for grasping and manipulating food. The term *jaws* is also broadly applied to the whole of the structures constituting the vault of the mouth and serving to open and close it and is part of the body plan of humans and most animals.

Arthropods

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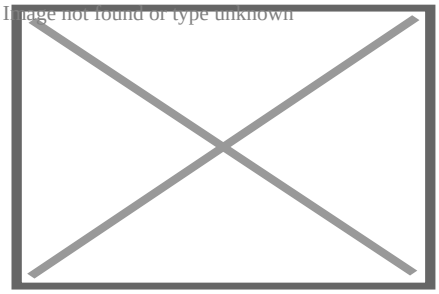
Further information: Mandible (arthropod mouthpart) and Mandible (insect mouthpart)



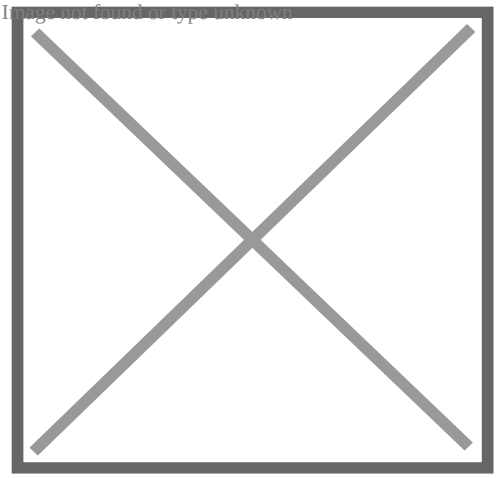
The mandibles of a bull ant

In arthropods, the jaws are chitinous and oppose laterally, and may consist of *mandibles* or *chelicerae*. These jaws are often composed of numerous mouthparts. Their function is fundamentally for food acquisition, conveyance to the mouth, and/or initial processing (*mastication* or *chewing*). Many mouthparts and associate structures (such as pedipalps) are modified legs.

Vertebrates

[edit]

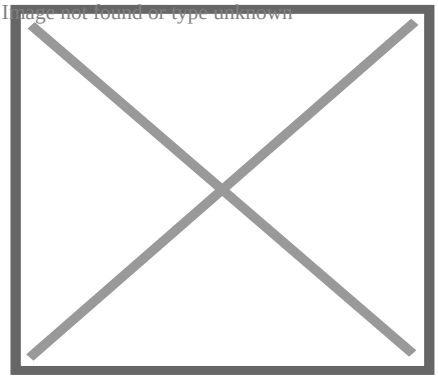
In most vertebrates, the jaws are bony or cartilaginous and oppose vertically, comprising an *upper jaw* and a *lower jaw*. The vertebrate jaw is derived from the most anterior two pharyngeal arches supporting the gills, and usually bears numerous teeth.



Jaws of a great white shark

Fish

[edit]



Moray eels have two sets of jaws: the oral jaws that capture prey and the pharyngeal jaws that advance into the mouth and move prey from the oral jaws to the esophagus for swallowing.

Main article: Fish jaw

The vertebrate jaw probably originally evolved in the Silurian period and appeared in the Placoderm fish which further diversified in the Devonian. The two most anterior pharyngeal arches are thought to have become the jaw itself and the hyoid arch, respectively. The hyoid system suspends the jaw from the braincase of the skull, permitting great mobility of the jaws. While there is no fossil evidence directly to support this theory, it makes sense in light of the numbers of pharyngeal arches that are visible in extant jawed vertebrates (the Gnathostomes), which have seven arches, and primitive jawless vertebrates (the Agnatha), which have nine.

The original selective advantage offered by the jaw may not be related to feeding, but rather to increased respiration efficiency.[1] The jaws were used in the buccal pump (observable in modern fish and amphibians) that pumps water across the gills of fish or air into the lungs in the case of amphibians. Over evolutionary time the more familiar use of jaws (to humans), in feeding, was selected for and became a very important function in vertebrates. Many teleost fish have substantially modified jaws for suction feeding and jaw protrusion, resulting in highly complex jaws with dozens of bones involved.[2]

Amphibians, reptiles, and birds

[edit]

The jaw in tetrapods is substantially simplified compared to fish. Most of the upper jaw bones (premaxilla, maxilla, jugal, quadratojugal, and quadrate) have been fused to the braincase, while the lower jaw bones (dentary, splenial, angular, surangular, and articular) have been fused together into a unit called the mandible. The jaw articulates via a hinge joint between the quadrate and articular. The jaws of tetrapods exhibit varying degrees of mobility between jaw bones. Some species have jaw bones completely fused, while others may have joints allowing for mobility of the dentary, quadrate, or maxilla. The snake skull shows the greatest degree of cranial kinesis, which allows the snake to swallow large prey items.

Mammals

[edit]

In mammals, the jaws are made up of the mandible (lower jaw) and the maxilla (upper jaw). In the ape, there is a reinforcement to the lower jaw bone called the simian shelf. In the evolution of the mammalian jaw, two of the bones of the jaw structure (the articular bone of the lower jaw, and quadrate) were reduced in size and incorporated into the ear, while many others have been fused together.[3] As a result, mammals show little or no cranial kinesis, and the mandible is attached to the temporal bone by the temporomandibular joints. Temporomandibular joint dysfunction is a common disorder of these joints, characterized by pain, clicking and limitation of mandibular movement.[4] Especially in the therian mammal, the premaxilla that constituted the anterior tip of the upper jaw in reptiles has reduced in size; and most of the mesenchyme at the ancestral upper jaw tip has become a protruded mammalian nose.[5]

Sea urchins

[edit]

Sea urchins possess unique jaws which display five-part symmetry, termed the *Aristotle's lantern*. Each unit of the jaw holds a single, perpetually growing tooth composed of crystalline calcium carbonate.

See also

[edit]

- Muscles of mastication
- Otofacial syndrome
- Predentary
- Prognathism
- Rostral bone

References

[edit]

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5. **^** *Higashiyama, Hiroki; Koyabu, Daisuke; Hirasawa, Tatsuya; Werneburg, Ingmar; Kuratani, Shigeru; Kurihara, Hiroki (November 2, 2021). "Mammalian face as an evolutionary novelty". PNAS. **118** (44): e2111876118. Bibcode:2021PNAS..11811876H. doi:10.1073/pnas.2111876118. PMC 8673075. PMID 34716275.*

External links

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- Jaw at the U.S. National Library of Medicine Medical Subject Headings (MeSH)
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Human regional anatomy

Body

Skin

Head

- Hair
- Face
  - Forehead
  - Cheek
  - Chin
  - Eyebrow
  - Eye
  - Eyelid
  - Nose
  - Mouth
  - Lip
  - Tongue
  - Tooth
- Ear
- Jaw
- Mandible
- Occiput
- Scalp
- Temple
- Adam's apple

Neck

- Throat
- Nape

- **Torso (Trunk)**
  - Abdomen
    - Waist
    - Midriff
    - Navel
  - Vertebral column
  - Back
  - Thorax
    - Breast
    - Nipple
  - Pelvis
  - Genitalia
    - Penis
    - Scrotum
    - Vulva
  - Anus
- **Limbs**
  - **Arm**
    - Shoulder
    - Axilla
    - Elbow
    - Forearm
    - Wrist
    - Hand
      - Finger
      - Fingernail
      - Thumb
      - Index
      - Middle
      - Ring
      - Little
  - **Leg**
    - Buttocks
    - Hip
    - Thigh
    - Knee
    - Calf
    - Foot
      - Ankle
      - Heel
      - Toe
      - Toenail
      - Sole

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The facial skeleton of the skull

Maxilla	**Surfaces**	○ Anterior: *fossae* (Incisive fossa, Canine fossa) ○ Infraorbital foramen ○ Orbital bones ○ Anterior nasal spine ○ Infratemporal: Alveolar canals ○ Maxillary tuberosity ○ Orbital: Infraorbital groove ○ Infraorbital canal ○ Nasal: Greater palatine canal ○ Zygomatic process
	Processes	○ Frontal process (Agger nasi, Anterior lacrimal crest) ○ Alveolar process ○ Palatine process (Incisive foramen, Incisive canals, Foramina of Scarpa, Incisive bone, Anterior nasal spine)
	Other	○ Body of maxilla ○ Maxillary sinus
Zygomatic		○ Orbital process (Zygomatico-orbital) ○ Temporal process (Zygomaticotemporal) ○ Lateral process (Zygomaticofacial)
Palatine	**Fossae**	○ Pterygopalatine fossa ○ Pterygoid fossa
	Plates	○ Horizontal plate (Posterior nasal spine) ○ Perpendicular plate (Greater palatine canal, Sphenopalatine foramen) ○ Hard palate
	Processes	○ Pyramidal ○ Orbital ○ Sphenoidal

Mandible	**Body**	○ *external surface* (Chin, Jaw, Mandibular prominence, Mandibular symphysis, Lingual foramen, Mental protuberance, Mental foramen, Mandibular incisive canal) ○ *internal surface* (Mental spine, Mylohyoid line, Sublingual fovea, Submandibular fovea) ○ Alveolar part ○ Mylohyoid groove ○ Mandibular canal ○ Lingula
	Ramus	○ Mandibular foramen ○ Angle ○ Coronoid process ○ Mandibular notch ○ Condyloid process ○ Pterygoid fovea
Nose		○ Nasal bone ○ Internasal suture ○ Nasal foramina ○ Inferior nasal concha ○ Ethmoidal process ○ Maxillary process ○ Vomer ○ Wing ○ Lacrimal ○ Posterior lacrimal crest ○ Lacrimal groove ○ Lacrimal hamulus
Other		○ Prognathism ○ Retromolar space

Portal:

- icon Anatomy

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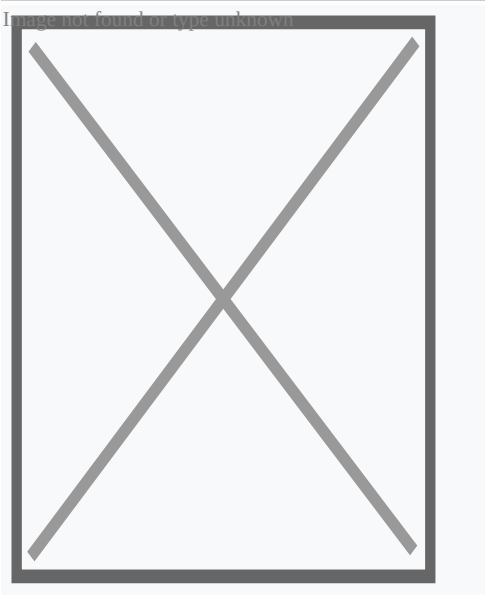
About malocclusion

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

Malocclusion



Malocclusion in 10-year-old girl

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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

[edit]

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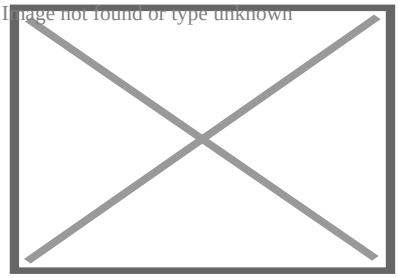
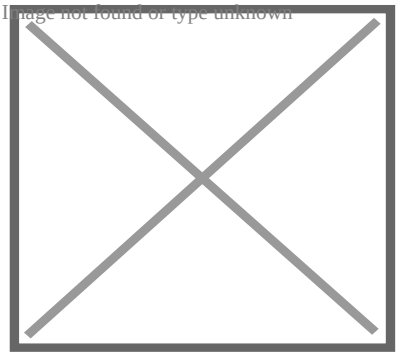

Class I with severe crowding and labially erupted canines


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 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

[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]

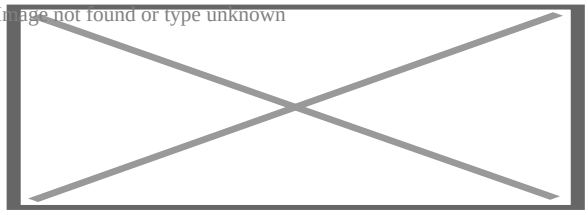
Identifying inter-arch tooth size discrepancy (ITSD) before treatment begins allows the practitioner to develop the treatment plan in a way that will take ITSD into account. ITSD corrective treatment may entail demanding reduction (interproximal wear), increase (crowns and resins), or elimination (extractions)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

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External links

[edit]

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

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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

About orthodontics

Orthodontics

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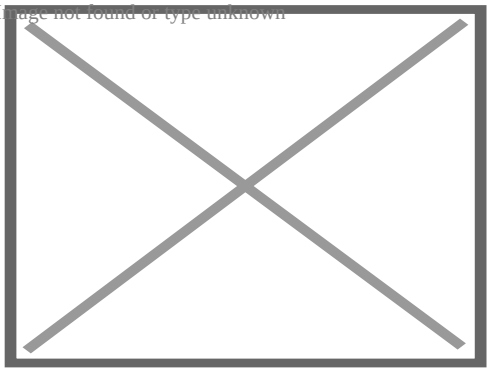


Connecting the arch-wire on brackets with wire

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

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

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

History

[edit]

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

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

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

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

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

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

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

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

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

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

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

Evolution of the current orthodontic appliances

[edit]

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

Fixed appliances

[edit]

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

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

E-arch

[edit]

Edward H. Angle made a significant contribution to the dental field when he released the 7th edition of his book in 1907, which outlined his theories and detailed his technique. This approach was founded upon the iconic "E-Arch" or 'the-arch' shape as

well as inter-maxillary elastics.[21] This device was different from any other appliance of its period as it featured a rigid framework to which teeth could be tied effectively in order to recreate an arch form that followed pre-defined dimensions.[22] Molars were fitted with braces, and a powerful labial archwire was positioned around the arch. The wire ended in a thread, and to move it forward, an adjustable nut was used, which allowed for an increase in circumference. By ligation, each individual tooth was attached to this expansive archwire.[8]

Pin and tube appliance

[edit]

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

Ribbon arch

[edit]

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

Edgewise appliance

[edit]

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

Labiolingual

[edit]

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

Twin wire

[edit]

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

Begg's Appliance

[edit]

Returning to Australia in the 1920s, the renowned orthodontist, Raymond Begg, applied his knowledge of ribbon arch appliances, which he had learned from the Angle School. On top of this, Begg recognized that extracting teeth was sometimes vital for successful outcomes and sought to modify the ribbon arch appliance to provide more control when dealing with root positioning. In the late 1930s, Begg developed his adaptation of the appliance, which took three forms. Firstly, a high-strength 16-mil round stainless steel wire replaced the original precious metal ribbon arch. Secondly, he kept the same ribbon arch bracket but inverted it so that it pointed toward the gums instead of away from them. Lastly, auxiliary springs were added to control root movement. This resulted in what would come to be known as the Begg Appliance. With this design, friction was decreased since contact between wire and bracket was minimal, and binding was minimized due to tipping and uprighting being used for anchorage control, which lessened contact angles between wires and corners of the bracket.

Tip-Edge System

[edit]

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

Contemporary edgewise systems

[edit]

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

Automatic rotational control

[edit]

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

Alteration in bracket slot dimensions

[edit]

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

Straight-wire bracket prescriptions

[edit]

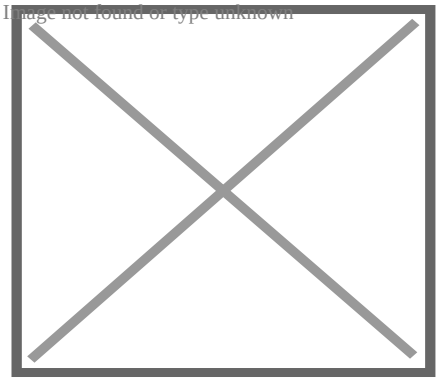
Rather than rely on the same bracket for all teeth, L.F. Andrews found a way to make different brackets for each tooth in the 1980s, thanks to the increased convenience of bonding.[28] This adjustment enabled him to avoid having multiple bends in archwires that would have been needed to make up for variations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

Given the discrepancies in inclination of facial surfaces across individual teeth, placing a twist, otherwise known as third-order or torque bends, into segments of each rectangular archwire was initially required with the edgewise appliance. These bends were necessary for all patients and wires, not just to avoid any unintentional movement of suitably placed teeth or when moving roots facially or lingually. Angulation of either brackets or slots can minimize the need for second-order or tip bends on archwires. Contemporary edgewise appliances come with brackets designed to adjust for any

facial inclinations, thereby eliminating or reducing any third-order bends. These brackets already have angulation and torque values built in so that each rectangluar archwire can be contorted to form a custom fit without inadvertently shifting any correctly positioned teeth. Without bracket angulation and torque, second-order or tip bends would still be required on each patient's archwire.

Methods

[edit]



Upper and lower jaw functional expanders

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

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

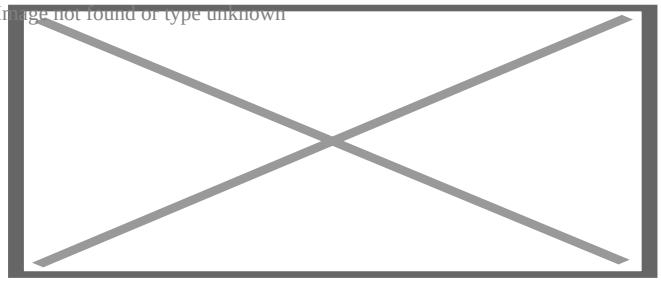
Fixed appliances may be used, for example, to rotate teeth if they do not fit the arch shape of the other teeth in the mouth, to adjust multiple teeth to different places, to change the tooth angle of teeth, or to change the position of a tooth's root. This

treatment course is not preferred where a patient has poor oral hygiene, as decalcification, tooth decay, or other complications may result. If a patient is unmotivated (insofar as treatment takes several months and requires commitment to oral hygiene), or if malocclusions are mild.

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

Braces

[edit]



Dental braces

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

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

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

Treatment duration

[edit]

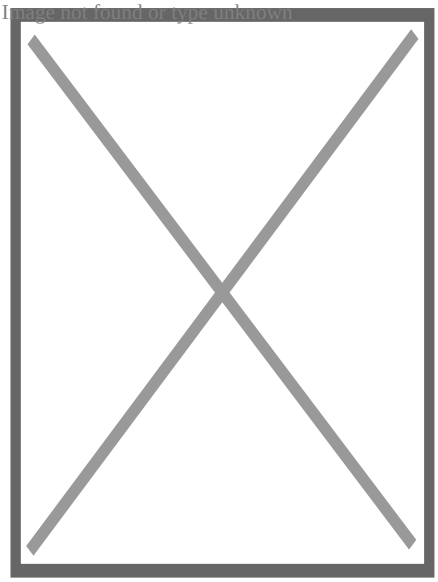
The time required for braces varies from person to person as it depends on the severity of the problem, the amount of room available, the distance the teeth must travel, the health of the teeth, gums, and supporting bone, and how closely the patient

follows instructions. On average, however, once the braces are put on, they usually remain in place for one to three years. After braces are removed, most patients will need to wear a retainer all the time for the first six months, then only during sleep for many years.[39]

Headgear

[edit]

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



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

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

Palatal expansion

[edit]

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

Jaw surgery

[edit]

Jaw surgery may be required to fix severe malocclusions.[42] The bone is broken during surgery and stabilized with titanium (or bioresorbable) plates and screws to allow for healing to take place.[43] After surgery, regular orthodontic treatment is used to move the teeth into their final position.[44]

During treatment

[edit]

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

Post treatment

[edit]

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

Removable retainers

[edit]

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

Fixed retainers

[edit]

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

Palatal expander

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Palatal expander

Orthodontic headgear

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Orthodontic headgear
An X-ray taken for skull analysis

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An X-ray taken for skull analysis
Top (left) and bottom retainers

- Image not found or type unknown

Top (left) and bottom retainers

Clear aligners

[edit]

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

Training

[edit]

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

Australia

[edit]

In Australia, to obtain an accredited three-year full-time university degree in orthodontics, one will need to be a qualified dentist (complete an AHPRA-registered general dental degree) with a minimum of two years of clinical experience. There are several universities in Australia that offer orthodontic programs: the University of Adelaide, the University of Melbourne, the University of Sydney, the University of Queensland, the University of Western Australia, and the University of Otago.[51] Orthodontic courses are accredited by the Australian Dental Council and reviewed by the Australian Society of Orthodontists (ASO). Prospective applicants should obtain information from the relevant institution before applying for admission.[52] After completing a degree in orthodontics, specialists are required to be registered with the Australian Health Practitioner Regulation Agency (AHPRA) in order to practice.[53][54]

Bangladesh

[edit]

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

Canada

[edit]

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

United States

[edit]

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

The program generally lasts for two to three years, and by the final year, graduates are required to complete the written American Board of Orthodontics (ABO) exam.[61] This exam is also broken down into two components: a written exam and a clinical exam.[61] The written exam is a comprehensive exam that tests for the applicant's knowledge of basic sciences and clinical concepts.[61] The clinical exam, however, consists of a Board Case Oral Examination (BCOE), a Case Report Examination (CRE), and a Case Report Oral Examination (CROE).[61] Once certified, certification must then be renewed every ten years.[61] Orthodontic programs can award a Master of Science degree, a Doctor of Science degree, or a Doctor of Philosophy degree, depending on the school and individual research requirements.[62]

United Kingdom

[edit]

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

See also

[edit]

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

Notes

[edit]

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

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

Conditions

- 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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Dentistry

Specialties	○ Endodontics ○ Oral and maxillofacial pathology ○ Oral and maxillofacial radiology ○ Oral and maxillofacial surgery ○ Orthodontics and dentofacial orthopedics ○ Pediatric dentistry ○ Periodontics ○ Prosthodontics ○ Dental public health ○ Cosmetic dentistry ○ Dental implantology ○ Geriatric dentistry ○ Restorative dentistry ○ Forensic odontology ○ Dental traumatology ○ Holistic dentistry

Dental surgery	○ Dental extraction ○ Tooth filling ○ Root canal therapy ○ Root end surgery ○ Scaling and root planing ○ Teeth cleaning ○ Dental bonding ○ Tooth polishing ○ Tooth bleaching ○ Socket preservation ○ Dental implant
Organisations	○ American Association of Orthodontists ○ British Dental Association ○ British Dental Health Foundation ○ British Orthodontic Society ○ Canadian Association of Orthodontists ○ Dental Technologists Association ○ General Dental Council ○ Indian Dental Association ○ National Health Service
By country	○ Canada ○ Philippines ○ Israel ○ United Kingdom ○ United States
See also	○ Index of oral health and dental articles ○ Outline of dentistry and oral health ○ Dental fear ○ Dental instruments ○ Dental material ○ History of dental treatments ○ Ancient Rome ○ Infant oral mutilation ○ Mouth assessment ○ Oral hygiene

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Cleft lip and cleft palate

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