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
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The use of vibration devices in orthodontics has been a topic of increasing interest, especially in recent years, as they offer a potential means to accelerate tooth movement and reduce treatment time. Devices like AcceleDent and VPro have been developed to apply gentle vibrations to the teeth and surrounding bone, which can stimulate cellular activity and accelerate the body's natural bone remodeling processes. This technology is based on the osteogenic orthodontics method, where vibrational forces are used to facilitate faster tooth movement.

For children undergoing orthodontic treatment, these devices can be especially beneficial. By reducing discomfort and potentially shortening treatment time, vibration devices can make the orthodontic process more comfortable and efficient. Proper oral hygiene is crucial during orthodontic treatment **Children's braces treatment** mouth. AcceleDent, for example, uses SoftPulse Technology to deliver micro-vibrations that have been shown to accelerate tooth movement by 38% to 50% in clinical trials. It is designed to be used for 20 minutes daily and is safe for children, as it doesn't cause discomfort and is easy to use.

VPro, another high-frequency vibration device, is used for just five minutes a day and can also reduce treatment time by up to 50%. It is designed to be comfortable and easy to incorporate into daily routine, enhancing the effectiveness of braces or clear aligners without additional food restrictions or oral hygiene steps.

The benefits of these devices are not only in accelerating treatment but also in reducing the discomfort associated with orthodontic treatment. By enhancing bone remodeling, they facilitate faster tooth movement, which can be especially appealing for children who may find extended treatment periods less appealing.

In addition to their effectiveness, these devices are also convenient and travel-friendly, which is an important factor for children and their daily life. Overall, vibration devices like AcceleDent and VPro offer a significant potential for improving the orthodontic treatment process for children, combining effectiveness with increased patient acceptance.

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**

The Role of Vibration Devices in Faster Tooth Movement

Vibration devices have become an exciting addition to orthodontic treatments, with the AcceleDent technology at the forefront. This innovative system uses SoftPulse Technology, which delivers gentle micro-vibrations to the teeth and surrounding bone. By harnessing these vibrations, AcceleDent can potentially increase tooth movement speed by 38% to 50% and reduce discomfort during orthodontic treatment.

AcceleDent is not a standalone treatment but rather a supplement to traditional braces or clear aligners. It is designed to be used for 20 minutes daily, during which it releases tiny vibrations that help stimulate cellular activity in the bone surrounding the teeth. This stimulation accelerates the natural bone remodeling process, allowing teeth to move more quickly and with less discomfort.

The benefits of using vibration devices like AcceleDent are significant. Patients can experience a more efficient orthodontic process, reducing the overall treatment time. This is especially appealing for patients who are undergoing long or comprehensive orthodontic treatments. The technology is also safe and has been clinically proven to be effective, with many dentists and orthodontists across the U.S. supporting it.

Vibration devices, in addition to AcceleDent, include other types like the VPro system. These devices, while different in their specific use and duration, all work on the same underlying concept of using vibrations to enhance tooth movement. For example, the VPro device is used for just five minutes daily and is also designed to accelerate orthodontic treatment when used with braces or aligners.

The use of vibration devices in orthodontics is a step in the right directions for patients who want faster results without the need for more forceful or traditional methods. By providing a more comfortable and efficient alternative, these devices are not only reducing treatment times but also increasing patient experience and overall treatment effectiveness.

The HealthyStart System

The use of vibration technology in orthodontics has been a topic of increasing research, with a focus on accelerating tooth movement. One of the devices that has been developed for this

purpose is the AcceleDent Aura, which is designed to be safe and effective for both adults and children. For children, the AcceleDent Aura offers several clinical advantages. It is a hands-free device that can be used for just 20 minutes each day, which is appealing to children as it allows them to go about their daily activities while using it. This comfort and simplicity are significant advantages, as it can be used while reading, watching television, or doing school work, which helps in ensuring that children can follow the treatment without much discomfort or additional time out of their daily activities.

The AcceleDent Aura uses SoftPulse Technology to deliver gentle micro-vibrations to the teeth and surrounding bone. These micro-vibrations have been shown in clinical trials to accelerate tooth movement by 38% to 50%. This acceleration can potentially reduce the overall treatment time, which is beneficial for children who may have to use orthodontic appliances for several years. The device is also FDA-cleared as a Class II medical device, ensuring it is safe for use.

While there is some evidence supporting the effectiveness of AcceleDent in accelerating tooth movement, other studies have found no significant difference between using vibrating devices and conventional methods. However, for children, the comfort and reduced treatment time associated with devices like AcceleDent Aura can be a significant clinical and quality of life boon. The technology is not only safe but also helps in reducing discomfort associated with orthodontic treatment, which is a common issue for many children undergoing orthodontic treatment. Overall, the use of vibration devices like AcceleDent Aura offers a potentially more comfortable and faster orthodontic treatment for children, though more comprehensive research is needed to further assess their effectiveness.

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.

The application of vibrations in orthodontic treatment has been a subject of increasing research and clinical application, with a focus on accelerating tooth movement and potentially shortening treatment duration. This innovative use of vibration devices is based on the biological process of bone remodeling, which is a natural process where old bone is resorbed and new bone is formed. By stimulating this process, vibrations can enhance the rate at which teeth move into their desired positions.

Vibration devices, like the VPro, work by applying gentle vibrational forces to the teeth and surrounding bone. These forces stimulate cellular activity, leading to faster bone remodeling and, as a result, quicker tooth movement. When used as a supplement to traditional orthodontic treatments, these devices can reduce treatment time by up to 50 percent. The VPro, for example, requires only five minutes of daily use and is comfortable to wear, providing a convenient and efficient addition to orthodontic treatment.

The scientific foundation of vibration in orthodontics involves osteogenic orthodontics, which involves applying vibrational forces to stimulate bone cells and tissues. This not only aids in accelerating tooth movement but also helps in regenerating bone around dental roots, which can stabilize teeth and reduce the need for retainers after treatment. Research has shown that high-frequency vibrations are more effective in bone formation than low-frequency vibrations, highlighting the potential for vibration to enhance bone health and orthodontic treatment effectiveness.

In addition to accelerating tooth movement, vibration devices can also help relieve discomfort associated with orthodontic treatment. By stimulating the bone and tissues, these devices can make orthodontic adjustments less discomforting, improving the overall patient's treatment process. However, while some studies have shown significant benefits, other research has

found that the clinical advantage of using vibrational devices may not be as clear in all aspects of orthodontic treatment, highlighting the need for further investigation.

In recent years, the use of vibration devices has been extended to not just accelerate tooth movement during treatment but also to stabilize teeth after orthodontic treatment. By enhancing bone formation around dental roots, these devices can potentially shorten the time spent wearing retainers, which is often longer than the time spent in braces. This application of vibration technology offers new perspectives on how to make orthodontic treatment more efficient and less time-consuming for patients.

In Conclusion, the application of vibrations in orthodontic treatment is a significant area of research and clinical application. By stimulating bone remodeling and enhancing cellular activity, vibration devices can accelerate tooth movement and potentially shorten treatment duration. With their potential to reduce discomfort and stabilize teeth after treatment, these devices offer a new and innovative way to make orthodontic treatment more efficient and comfortable for patients.

Myobrace: A No-Braces Approach

The Role of Vibration Devices in Faster Tooth Movement

Vibration devices have become an innovative adjunct in orthodontic treatments, including aligner therapy, to accelerate tooth movement and reduce overall treatment time. The VPro device is one such example, which uses high-frequency vibration to stimulate bone remodeling and facilitate faster tooth alignment. This technology is designed to be used for just five minutes daily, making it a convenient and efficient way to supplement traditional orthodontic treatments like braces or clear aligners.

The VPro device works by applying gentle vibrations to the teeth and surrounding bone, enhancing cellular activity and accelerating the natural bone remodeling processes. This results in faster tooth movement and can reduce treatment time by up to 50 percent. It also helps in seating aligners more effectively, which can reduce discomfort and the need for additional refinement aligners.

In practice, combining high-frequency vibration devices like VPro with aligner therapy not only shortening treatment duration but also improves patient comfort. The vibrations help in reducing orthodontic discomfort by releasing pain receptors and reducing inflammatory pressure, making the treatment experience more comfortable and predictable.

In the orthodontic treatment space, other vibration systems may offer different application times and methods, but they share the same aim of enhancing tooth movement. For example, low-frequency mechanical vibration devices like AcceleDent have been used to accelerate treatment, though results can vary based on individual biological responses.

The use of vibration devices in orthodontics is a significant step in the technology's progress, providing a more efficient and comfortable alternative to traditional methods. As these devices become more advanced and their benefits more well-acknowledged, they are set to become an important adjunct in orthodontic care, helping patients achieve their desired smile faster and with less discomfort.

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.

The use of vibration technology in orthodontics has shown significant benefits, especially when combined with clear aligners like Invisalign. This technology, often utilized through small, user-friendly vibration tools, is designed to enhance the effectiveness of orthodontic treatments by facilitating faster tooth movement, reducing discomfort, and improving the seating of aligners. For children undergoing orthodontic treatment, these vibration tools can be especially beneficial.

Vibration technology works by gently providing high-frequency vibrations to the bone and gumline surrounding the teeth. This stimulation helps accelerate the body's natural process of bone remodeling, which is critical for tooth movement during orthodontic treatment. By using these vibration tools for just a short period each day, patients can experience a significant acceleration in tooth alignment. For example, the Propel VPro, a well-acknowledged device in this space, is FDA-approved and has proven to reduce treatment times substantially when used alongside clear aligners or traditional braces.

In the specific application to children, vibration technology can be a key tool in making orthodontic treatment more comfortable and efficient. Children often respond well to orthodontic treatments due to their dental development, and the use of clear aligners like Invisalign can be an effective choice when combined with proper treatment planning and consistent wear. However, the success of aligner treatment, especially in children, hinges on consistent use and proper hygiene habits. Vibration tools can enhance this process by reducing discomfort and making aligner wear more effective, which can be especially appealing for children who may be more averse to traditional braces.

While vibration technology is not a standalone treatment but rather an adjunctive tool, it offers a significant addition to traditional orthodontic methods. By accelerating tooth movement and reducing treatment times, these vibration tools can make orthodontic treatment more appealing and efficient for both children and adults. Ultimately, the combination of Invisalign

aligners with vibration technology can provide a more comfortable, faster, and more effective orthodontic treatment experience for patients of all age.

Comprehensive Orthodontic Solutions

The use of vibration devices in orthodontics is an innovative approach that could potentially accelerate tooth movement and enhance patient experience. Clinical trials have provided some evidence supporting the effectiveness of these devices, but the results are not consistently clear-cut. For example, some studies have found that high-frequency vibration can effectively speed up orthodontic tooth movement, while others have reported no significant impact on treatment duration when using low-frequency devices like AcceleDent[1][2][3]. These findings highlight the need for further research to better understand both the short and long term effects of vibration technology on tooth movement and patient discomfort.

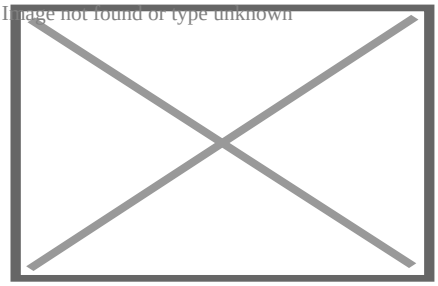
In the case of AcceleDent, which uses low-frequency mechanical vibration, some studies have reported a significant reduction in treatment time, with a 30% increase in the rate of tooth movement during orthodontic leveling[3]. However, other studies have found no significant difference in treatment duration when using similar devices[2]. High-frequency devices, such as the VPro5, have also been explored, with some studies suggesting they can enhance bone remodeling and accelerate tooth alignment[1][5]. The effectiveness of these devices can vary based on factors such as the frequency of vibration, duration of use, and individual biological responses.

As the technology continues to mature, it is important for clinical trials to focus on diverse aspects of orthodontic treatment, including pain reduction, gene expression, and tissue responses. This comprehensive approach will help to provide a more accurate evaluation of the benefits and potential long term effects of vibration devices. In addition, manufacturers

should accumulate non-biased evidence before promoting these products to patients, ensuring that any claims of effectiveness are supported by scientific data[2]. Overall, while vibration technology in orthodontics is promising, further research is necessary to guide its use effectively and to enhance patient care.

About jaw

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

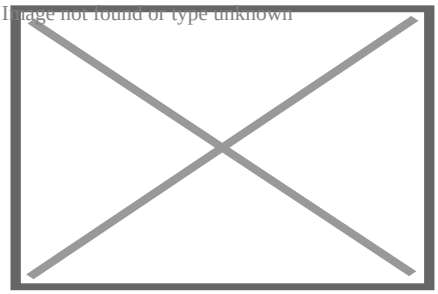


Human lower jaw viewed from the left

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

[edit]
Further information: Mandible (arthropod mouthpart) and Mandible (insect mouthpart)



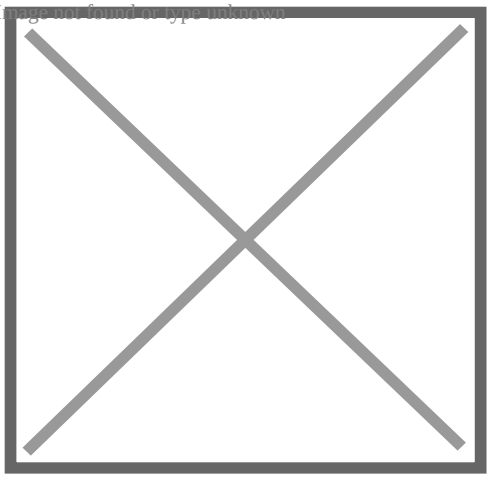
The mandibles of a bull ant

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

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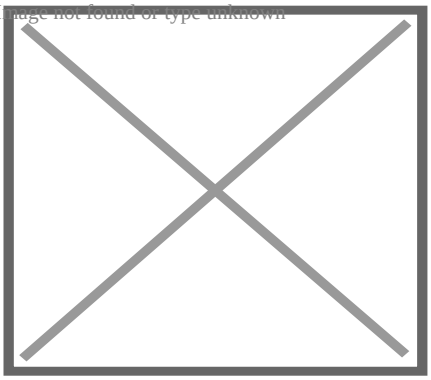

Moray eels have two sets of jaws: the oral jaws that capture prey and the pharyngeal jaws that advance into the mouth and move prey from the oral jaws to the esophagus for swallowing.

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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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 dental braces

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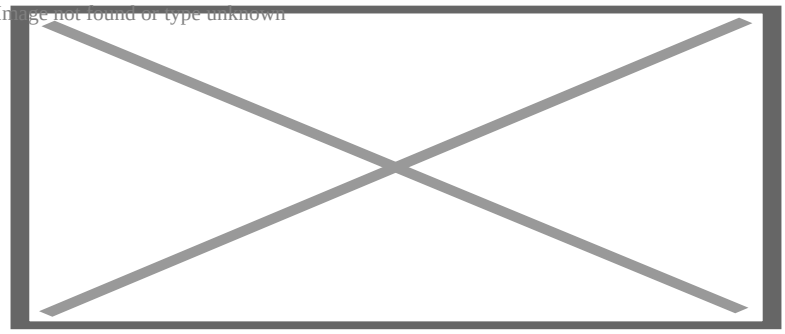

Dental braces

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

Process

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

Braces apply constant pressure which, over time, moves teeth into the desired positions. The process loosens the tooth after which new bone grows to support the tooth in its new position. This is called bone remodelling. Bone remodelling is a biomechanical process responsible for making bones stronger in response to sustained load-bearing activity and weaker in the absence of carrying a load. Bones are made of cells called osteoclasts and osteoblasts. Two different kinds of bone resorption are possible: direct resorption, which starts from the lining cells of the alveolar bone, and indirect or retrograde resorption, which occurs when the periodontal ligament has been subjected to an excessive amount and duration of compressive stress.[2] Another important factor associated with tooth

movement is bone deposition. Bone deposition occurs in the distracted periodontal ligament. Without bone deposition, the tooth will loosen, and voids will occur distal to the direction of tooth movement.[3]

Types

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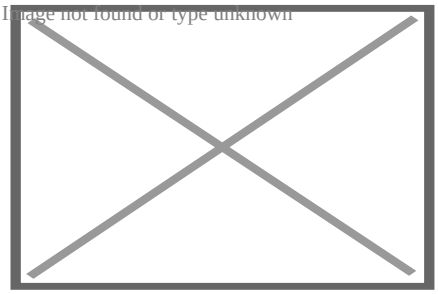
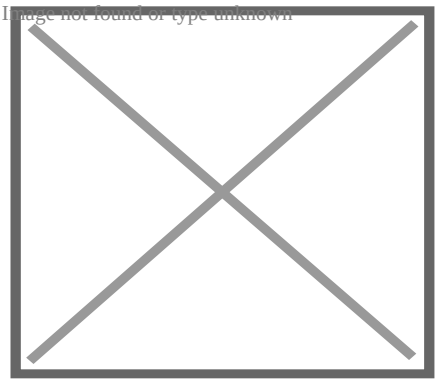


"Clear" braces



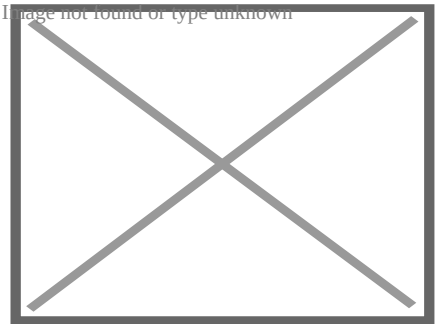
Upper and Lower Jaw Functional Expanders

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

more expensive than stainless steel braces.
- ***Customized orthodontic treatment systems*** combine high technology including 3-D imaging, treatment planning software and a robot to custom bend the wire. Customized systems such as this offer faster treatment times and more efficient results.[5]
- ***Progressive, clear removable aligners*** may be used to gradually move teeth into their final positions. Aligners are generally not used for complex orthodontic cases, such as when extractions, jaw surgery, or palate expansion are necessary.[*medical citation* [6]]

Fitting procedure

[edit]



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

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

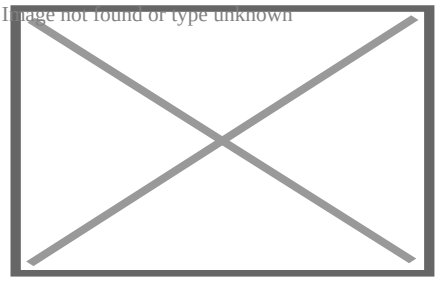
The first step is to determine whether braces are suitable for the patient. The doctor consults with the patient and inspects the teeth visually. If braces are appropriate, a records appointment is set up where X-rays, moulds, and impressions are made. These records are analyzed to determine the problems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

Typical treatment times vary from six months to two and a half years depending on the complexity and types of problems. Orthognathic surgery may be required in extreme

cases. About 2 weeks before the braces are applied, orthodontic spacers may be required to spread apart back teeth in order to create enough space for the bands.

Teeth to be braced will have an adhesive applied to help the cement bond to the surface of the tooth. In most cases, the teeth will be banded and then brackets will be added. A bracket will be applied with dental cement, and then cured with light until hardened. This process usually takes a few seconds per tooth. If required, orthodontic spacers may be inserted between the molars to make room for molar bands to be placed at a later date. Molar bands are required to ensure brackets will stick. Bands are also utilized when dental fillings or other dental works make securing a bracket to a tooth infeasible. Orthodontic tubes (stainless steel tubes that allow wires to pass through them), also known as molar tubes, are directly bonded to molar teeth either by a chemical curing or a light curing adhesive. Usually, molar tubes are directly welded to bands, which is a metal ring that fits onto the molar tooth. Directly bonded molar tubes are associated with a higher failure rate when compared to molar bands cemented with glass ionomer cement. Failure of orthodontic brackets, bonded tubes or bands will increase the overall treatment time for the patient. There is evidence suggesting that there is less enamel decalcification associated with molar bands cemented with glass ionomer cement compared with orthodontic tubes directly cemented to molars using a light cured adhesive. Further evidence is needed to withdraw a more robust conclusion due to limited data.[7]

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



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

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

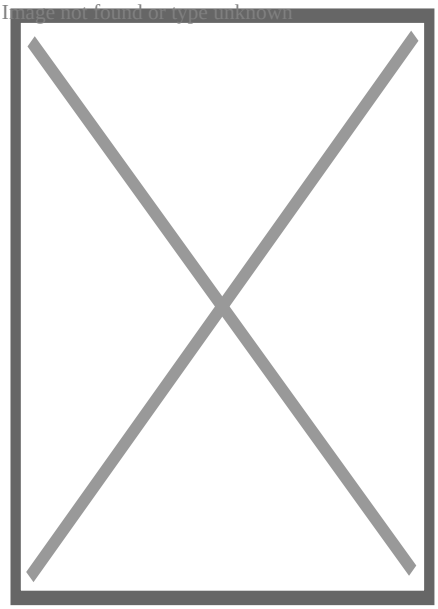
Brackets with hooks can be placed, or hooks can be created and affixed to the arch wire to affix rubber bands. The placement and configuration of the rubber bands will depend on the course of treatment and the individual patient. Rubber bands are made in different diameters, colours, sizes, and strengths. They are also typically available in two versions:

Coloured or clear/opaque.

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

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

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



Young Colombian man during an adjustment visit for his orthodontics

Braces are typically adjusted every three to six weeks. This helps shift the teeth into the correct position. When they get adjusted, the orthodontist removes the coloured or metal ligatures keeping the arch wire in place. The arch wire is then removed and may be

replaced or modified. When the archwire has been placed back into the mouth, the patient may choose a colour for the new elastic ligatures, which are then affixed to the metal brackets. The adjusting process may cause some discomfort to the patient, which is normal.

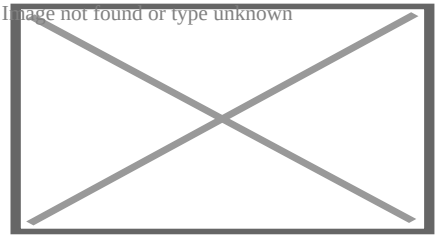
Post-treatment

[edit]

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

Retainers

[edit]
Main article: Retainer (orthodontic device)



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

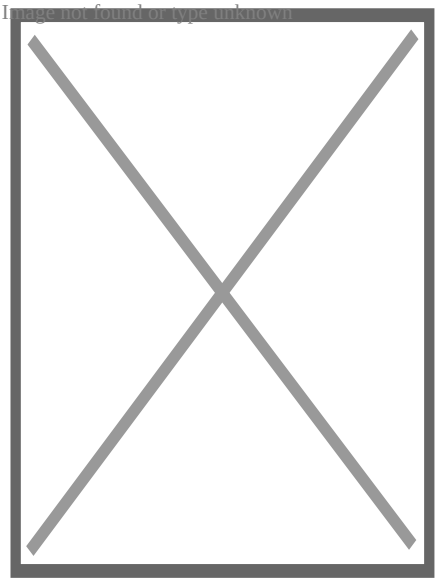
In order to prevent the teeth from moving back to their original position, retainers are worn once the treatment is complete. Retainers help in maintaining and stabilizing the position of teeth long enough to permit the reorganization of the supporting structures after the active phase of orthodontic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

Headgear

[edit]
Main article: Orthodontic headgear

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

Orthodontic headgear usually consists of three major components:



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

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

upper teeth, jaw backwards.

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

Pre-finisher

[edit]

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

Complications and risks

[edit]

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

Experiencing some pain following fitting and activation of fixed orthodontic braces is very common and several methods have been suggested to tackle this.[11][12] Pain associated with orthodontic treatment increases in proportion to the amount of force that is applied to the teeth. When a force is applied to a tooth via a brace, there is a reduction in the blood supply to the fibres that attach the tooth to the surrounding bone. This reduction in blood supply results in inflammation and the release of several chemical factors, which stimulate the pain response. Orthodontic pain can be managed using

pharmacological interventions, which involve the use of analgesics applied locally or systemically. These analgesics are divided into four main categories, including opioids, non-steroidal anti-inflammatory drugs (NSAIDs), paracetamol and local anesthesia. The first three of these analgesics are commonly taken systemically to reduce orthodontic pain.[13]

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

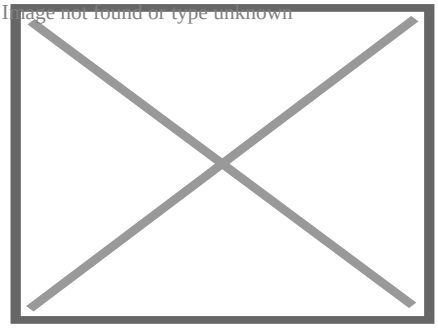
The dental displacement obtained with the orthodontic appliance determines in most cases some degree of root resorption. Only in a few cases is this side effect large enough to be considered real clinical damage to the tooth. In rare cases, the teeth may fall out or have to be extracted due to root resorption.[14][15]

History

[edit]

Ancient

[edit]



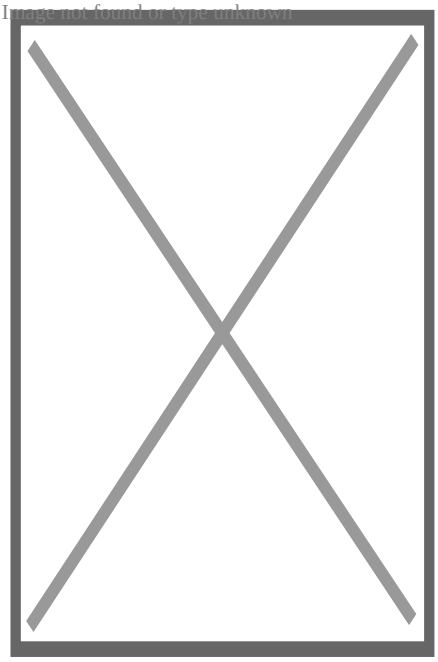
Old Braces at a museum in Jbeil, Lebanon

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

The Etruscans buried their dead with dental appliances in place to maintain space and prevent the collapse of the teeth during the afterlife. A Roman tomb was found with a number of teeth bound with gold wire documented as a ligature wire, a small elastic wire that is used to affix the arch wire to the bracket. Even Cleopatra wore a pair. Roman philosopher and physician Aulus Cornelius Celsus first recorded the treatment of teeth by finger pressure. Unfortunately, due to a lack of evidence, poor preservation of bodies, and primitive technology, little research was carried out on dental braces until around the 17th century, although dentistry was making great advancements as a profession by then.[*citation needed*]

18th century

[edit]



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

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

19th century

[edit]

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

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

20th century

[edit]

In the early 20th century, Edward Angle devised the first simple classification system for malocclusions, such as Class I, Class II, and so on. His classification system is still used today as a way for dentists to describe how crooked teeth are, what way teeth are pointing, and how teeth fit together. Angle contributed greatly to the design of orthodontic and dental appliances, making many simplifications. He founded the first school and college of orthodontics, organized the American Society of Orthodontia in 1901 which became the American Association of Orthodontists (AAO) in the 1930s, and founded the first orthodontic journal in 1907. Other innovations in orthodontics in the late 19th and early 20th centuries included the first textbook on orthodontics for children, published by J.J. Guilford in 1889, and the use of rubber elastics, pioneered by Calvin S. Case, along with Henry Albert Baker.

Today, space age wires (also known as dental arch wires) are used to tighten braces. In 1959, the Naval Ordnance Laboratory created an alloy of nickel and titanium called Nitinol. NASA further studied the material's physical properties.[17] In 1979, Dr. George Andreasen developed a new method of fixing braces with the use of the Nitinol wires

based on their superelasticity. Andreasen used the wire on some patients and later found out that he could use it for the entire treatment. Andreasen then began using the nitinol wires for all his treatments and as a result, dental doctor visits were reduced, the cost of dental treatment was reduced, and patients reported less discomfort.

See also

[edit]

- icon Medicine portal
- Mandibular advancement splint
- Oral and maxillofacial surgery
- Orthognathic surgery
- Prosthodontics
- Trismus
- Dental implant

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[edit]

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External links

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- Useful Resources: FAQ and Downloadable eBooks at Orthodontics Australia
- Orthos Explain: Treatment Options at Orthodontics Australia
- Image not found or type unknown Media related to Dental braces at Wikimedia Commons
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Orthodontics

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

Appliances	○ ACCO appliance ○ Archwire ○ Activator appliance ○ Braces ○ Damon system ○ Elastics ○ Frankel appliance ○ Invisalign ○ Lingual arch ○ Lip bumper ○ Herbst Appliance ○ List of orthodontic functional appliances ○ List of palatal expanders ○ Lingual braces ○ Headgear ○ Orthodontic technology ○ Orthodontic spacer ○ Palatal lift prosthesis ○ Palatal expander ○ Quad helix ○ Retainer ○ SureSmile ○ Self-ligating braces ○ Splint activator ○ Twin Block Appliance
Procedures	○ Anchorage (orthodontics) ○ Cantilever mechanics ○ Fiberotomy ○ Interproximal reduction ○ Intrusion (orthodontics) ○ Molar distalization ○ SARPE ○ Serial extraction
Materials	○ Beta-titanium ○ Nickel titanium ○ Stainless steel ○ TiMolium ○ Elgiloy ○ Ceramic ○ Composite ○ Dental elastics

Notable contributors

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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
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About child

"Children" and "Childhood" redirect here. For other uses, see Child (disambiguation), Children (disambiguation), and Childhood (disambiguation).

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International children in traditional clothing at Liberty Weekend

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Part of a series on

Human growth and development

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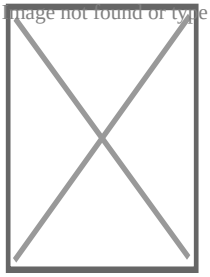

Stages

- Gamete
- Zygote
- Embryo
- Fetus
- Infant
- Toddler
- Child
- Preadolescent
- Adolescent
- Emerging and early adulthood
- Young adult
- Middle adult
- Old adult
- Dying

Biological milestones

- Fertilization
- Pregnancy
- Childbirth
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- Puberty
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- Ageing
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Development and psychology

- Pre- and perinatal
- Infant and child
- Nature versus nurture
- Adolescent
- Youth
- Young adult
- Adult
- Maturity

Developmental stage theories

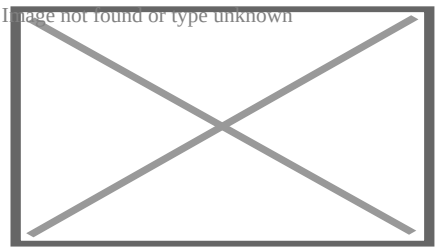
- Attachment
- Ecological
- Psychosocial
- Psychosexual development
- Moral
- Cognitive
- Cultural-historical
- Evolutionary
- Image not found or type unknown Psychology portal

A **child** (pl. **children**) is a human being between the stages of birth and puberty,[1][2] or between the developmental period of infancy and puberty.[3] The term may also refer to an unborn human being.[4][5] In English-speaking countries, the legal definition of *child* generally refers to a minor, in this case as a person younger than the local age of majority (there are exceptions like, for example, the consume and purchase of alcoholic beverage even after said age of majority[6]), regardless of their physical, mental and sexual development as biological adults.[1][7][8] Children generally have fewer rights and responsibilities than adults. They are generally classed as unable to make serious decisions.

Child may also describe a relationship with a parent (such as sons and daughters of any age)[9] or, metaphorically, an authority figure, or signify group membership in a clan, tribe, or religion; it can also signify being strongly affected by a specific time, place, or circumstance, as in "a child of nature" or "a child of the Sixties."[10]

Biological, legal and social definitions

[edit]



Children playing ball games, Roman artwork, 2nd century AD

In the biological sciences, a child is usually defined as a person between birth and puberty,[1][2] or between the developmental period of infancy and puberty.[3] Legally, the term *child* may refer to anyone below the age of majority or some other age limit.

The United Nations Convention on the Rights of the Child defines *child* as, "A human being below the age of 18 years unless under the law applicable to the child, majority is

attained earlier."[11] This is ratified by 192 of 194 member countries. The term *child* may also refer to someone below another legally defined age limit unconnected to the age of majority. In Singapore, for example, a *child* is legally defined as someone under the age of 14 under the "Children and Young Persons Act" whereas the age of majority is 21.[12][13] In U.S. Immigration Law, a child refers to anyone who is under the age of 21.[14]

Some English definitions of the word *child* include the fetus (sometimes termed *the unborn*).[15] In many cultures, a child is considered an adult after undergoing a rite of passage, which may or may not correspond to the time of puberty.

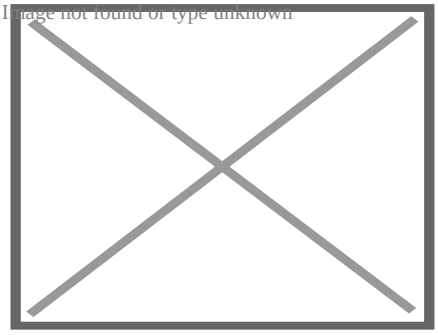
Children generally have fewer rights than adults and are classed as unable to make serious decisions, and legally must always be under the care of a responsible adult or child custody, whether their parents divorce or not.

Developmental stages of childhood

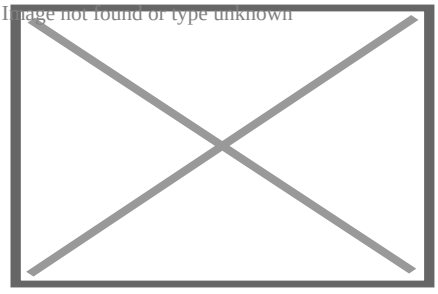
[edit]
Further information: Child development stages and Child development

Early childhood

[edit]



Children playing the violin in a group recital, Ithaca, New York, 2011



Children in Madagascar, 2011

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Child playing piano, 1984

Early childhood follows the infancy stage and begins with toddlerhood when the child begins speaking or taking steps independently.[16][17] While toddlerhood ends around age 3 when the child becomes less dependent on parental assistance for basic needs, early childhood continues approximately until the age of 5 or 6. However, according to the National Association for the Education of Young Children, early childhood also includes infancy. At this stage children are learning through observing, experimenting and communicating with others. Adults supervise and support the development process of the child, which then will lead to the child's autonomy. Also during this stage, a strong emotional bond is created between the child and the care providers. The children also start preschool and kindergarten at this age: and hence their social lives.

Middle childhood

[edit]

Middle childhood begins at around age 7, and ends at around age 9 or 10.[18] Together, early and middle childhood are called formative years. In this middle period, children develop socially and mentally. They are at a stage where they make new friends and gain new skills, which will enable them to become more independent and enhance their individuality. During middle childhood, children enter the school years, where they are presented with a different setting than they are used to. This new setting creates new challenges and faces for children.[19] Upon the entrance of school, mental disorders that would normally not be noticed come to light. Many of these disorders include: autism, dyslexia, dyscalculia, and ADHD.[20]:Ã¢â‚¬Å 303–309Ã¢â‚¬Å Special education, least restrictive environment, response to intervention and individualized education plans are all specialized plans to help children with disabilities.[20]:Ã¢â‚¬Å 310–311Ã¢â‚¬Å

Middle childhood is the time when children begin to understand responsibility and are beginning to be shaped by their peers and parents. Chores and more responsible decisions come at this time, as do social comparison and social play.[20] :Ã¢â‚¬Å 338Ã¢â‚¬Å During social play, children learn from and teach each other, often through observation.[21]

Late childhood

[edit]
Main article: Preadolescence

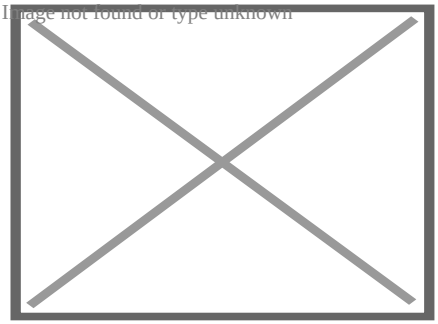
Preadolescence is a stage of human development following early childhood and preceding adolescence. Preadolescence is commonly defined as ages 9–12, ending with the major onset of puberty, with markers such as menarche, spermarche, and the peak of height velocity occurring. These changes usually occur between ages 11 and 14. It may also be defined as the 2-year period before the major onset of puberty.[22] Preadolescence can bring its own challenges and anxieties. Preadolescent children have a different view of the world from younger children in many significant ways. Typically, theirs is a more realistic view of life than the intense, fantasy-oriented world of earliest childhood. Preadolescents have more mature, sensible, realistic thoughts and actions: 'the most "sensible" stage of development...the child is a much *less emotional being* now.' [23] Preadolescents may well view human relationships differently (e.g. they may notice the flawed, human side of authority figures). Alongside that, they may begin to develop a sense of self-identity, and to have increased feelings of independence: 'may feel an individual, no longer "just one of the family."'[24]

Developmental stages post-childhood

[edit]

Adolescence

[edit]



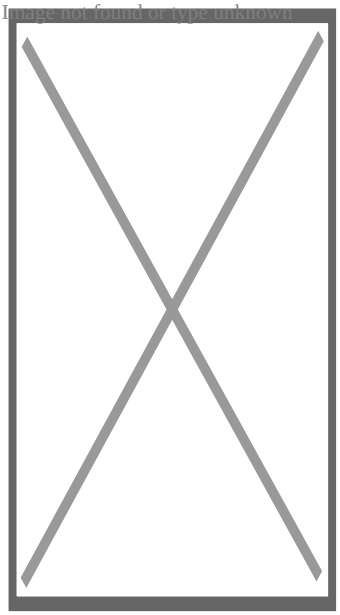
An adolescent girl, photographed by Paolo Monti

Adolescence is usually determined to be between the onset of puberty and legal adulthood: mostly corresponding to the teenage years (13–19). However, puberty usually

begins before the teenage years (10—11 for girls and 11—12 for boys). Although biologically a child is a human being between the stages of birth and puberty,[1][2] adolescents are legally considered children, as they tend to lack adult rights and are still required to attend compulsory schooling in many cultures, though this varies. The onset of adolescence brings about various physical, psychological and behavioral changes. The end of adolescence and the beginning of adulthood varies by country and by function, and even within a single nation-state or culture there may be different ages at which an individual is considered to be mature enough to be entrusted by society with certain tasks.

History

[edit]
Main article: History of childhood

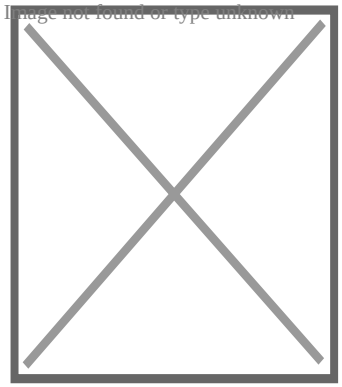


Playing Children, by Song dynasty Chinese artist Su Hanchen, c. 1150 AD.

During the European Renaissance, artistic depictions of children increased dramatically, which did not have much effect on the social attitude toward children, however.[25]

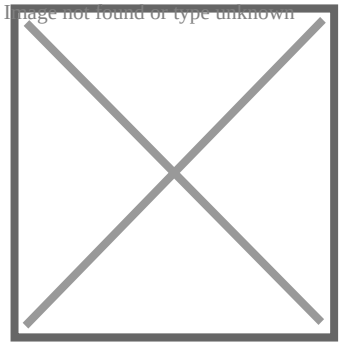
The French historian Philippe Ariès argued that during the 1600s, the concept of childhood began to emerge in Europe,[26] however other historians like Nicholas Orme have challenged this view and argued that childhood has been seen as a separate stage since at least the medieval period.[27] Adults saw children as separate beings, innocent and in need of protection and training by the adults around them. The English philosopher John Locke was particularly influential in defining this new attitude towards children, especially with regard to his theory of the tabula rasa, which considered the mind at birth to be a "blank slate". A corollary of this doctrine was that the mind of the child was born blank, and that it was the duty of the parents to imbue the child with

correct notions. During the early period of capitalism, the rise of a large, commercial middle class, mainly in the Protestant countries of the Dutch Republic and England, brought about a new family ideology centred around the upbringing of children. Puritanism stressed the importance of individual salvation and concern for the spiritual welfare of children.[28]



The Age of Innocence c. 1785/8. Reynolds emphasized the natural grace of children in his paintings.

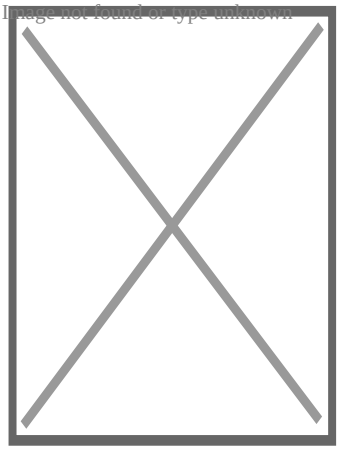
The modern notion of childhood with its own autonomy and goals began to emerge during the 18th-century Enlightenment and the Romantic period that followed it.[29][30] Jean Jacques Rousseau formulated the romantic attitude towards children in his famous 1762 novel *Emile: or, On Education*. Building on the ideas of John Locke and other 17th-century thinkers, Jean-Jaques Rousseau described childhood as a brief period of sanctuary before people encounter the perils and hardships of adulthood.[29] Sir Joshua Reynolds' extensive children portraiture demonstrated the new enlightened attitudes toward young children. His 1788 painting *The Age of Innocence* emphasizes the innocence and natural grace of the posing child and soon became a public favourite.[31]



Brazilian princesses Leopoldina (left) and Isabel (center) with an unidentified friend, c. 1860.

The idea of childhood as a locus of divinity, purity, and innocence is further expounded upon in William Wordsworth's "Ode: Intimations of Immortality from Recollections of Early Childhood", the imagery of which he "fashioned from a complex mix of pastoral aesthetics, pantheistic views of divinity, and an idea of spiritual purity based on an Edenic

notion of pastoral innocence infused with Neoplatonic notions of reincarnation".[30] This Romantic conception of childhood, historian Margaret Reeves suggests, has a longer history than generally recognized, with its roots traceable to similarly imaginative constructions of childhood circulating, for example, in the neo-platonic poetry of seventeenth-century metaphysical poet Henry Vaughan (e.g., "The Retreate", 1650; "Childe-hood", 1655). Such views contrasted with the stridently didactic, Calvinist views of infant depravity.[32]



Armenian scouts in 1918

With the onset of industrialisation in England in 1760, the divergence between high-minded romantic ideals of childhood and the reality of the growing magnitude of child exploitation in the workplace, became increasingly apparent. By the late 18th century, British children were specially employed in factories and mines and as chimney sweeps,[33] often working long hours in dangerous jobs for low pay.[34] As the century wore on, the contradiction between the conditions on the ground for poor children and the middle-class notion of childhood as a time of simplicity and innocence led to the first campaigns for the imposition of legal protection for children.

British reformers attacked child labor from the 1830s onward, bolstered by the horrific descriptions of London street life by Charles Dickens.[35] The campaign eventually led to the Factory Acts, which mitigated the exploitation of children at the workplace[33][36]

Modern concepts of childhood

[edit]

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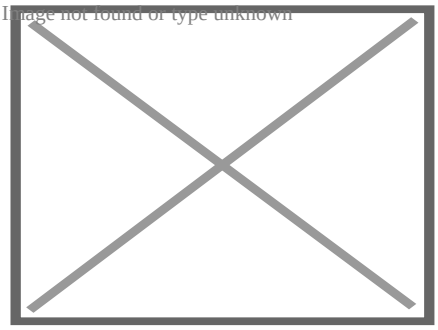

Children play in a fountain in a summer evening, Davis, California.

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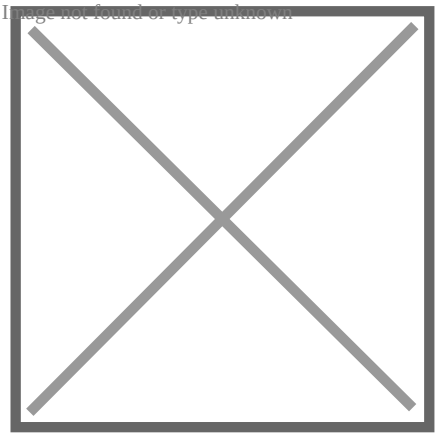

An old man and his granddaughter in Turkey.

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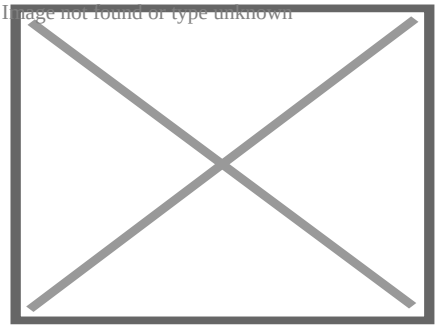

Nepalese children playing with cats.

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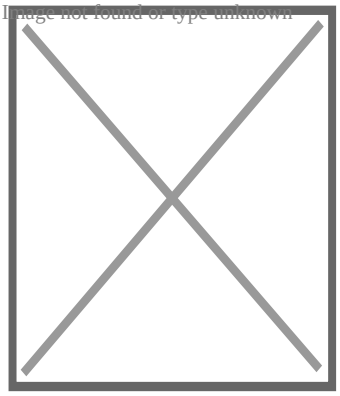


Harari girls in Ethiopia.

The modern attitude to children emerged by the late 19th century; the Victorian middle and upper classes emphasized the role of the family and the sanctity of the child – an attitude that has remained dominant in Western societies ever since.[37] The genre of children's literature took off, with a proliferation of humorous, child-oriented books attuned to the child's imagination. Lewis Carroll's fantasy *Alice's Adventures in Wonderland*, published in 1865 in England, was a landmark in the genre; regarded as the first "English masterpiece written for children", its publication opened the "First Golden Age" of children's literature.

The latter half of the 19th century saw the introduction of compulsory state schooling of children across Europe, which decisively removed children from the workplace into schools.[38][39]

The market economy of the 19th century enabled the concept of childhood as a time of fun, happiness, and imagination. Factory-made dolls and doll houses delighted the girls and organized sports and activities were played by the boys.[40] The Boy Scouts was founded by Sir Robert Baden-Powell in 1908,[41][42] which provided young boys with outdoor activities aiming at developing character, citizenship, and personal fitness qualities.[43]

In the 20th century, Philippe Ariès, a French historian specializing in medieval history, suggested that childhood was not a natural phenomenon, but a creation of society in his 1960 book *Centuries of Childhood*. In 1961 he published a study of paintings, gravestones, furniture, and school records, finding that before the 17th century, children were represented as mini-adults.

In 1966, the American philosopher George Boas published the book *The Cult of Childhood*. Since then, historians have increasingly researched childhood in past times.[44]

In 2006, Hugh Cunningham published the book *Invention of Childhood*, looking at British childhood from the year 1000, the Middle Ages, to what he refers to as the Post War Period of the 1950s, 1960s and 1970s.[45]

Childhood evolves and changes as lifestyles change and adult expectations alter. In the modern era, many adults believe that children should not have any worries or work, as life should be happy and trouble-free. Childhood is seen as a mixture of simplicity, innocence, happiness, fun, imagination, and wonder. It is thought of as a time of playing, learning, socializing, exploring, and worrying in a world without much adult interference.[29][30]

A "loss of innocence" is a common concept, and is often seen as an integral part of coming of age. It is usually thought of as an experience or period in a child's life that widens their awareness of evil, pain or the world around them. This theme is demonstrated in the novels *To Kill a Mockingbird* and *Lord of the Flies*. The fictional

character Peter Pan was the embodiment of a childhood that never ends.[46][47]

Healthy childhoods

[edit]

Role of parents

[edit]
Main article: Parenting

Children's health

[edit]
Further information: Childhood obesity, Childhood immunizations, and List of childhood diseases

Children's health includes the physical, mental and social well-being of children. Maintaining children's health implies offering them healthy foods, insuring they get enough sleep and exercise, and protecting their safety.[48] Children in certain parts of the world often suffer from malnutrition, which is often associated with other conditions, such diarrhea, pneumonia and malaria.[49]

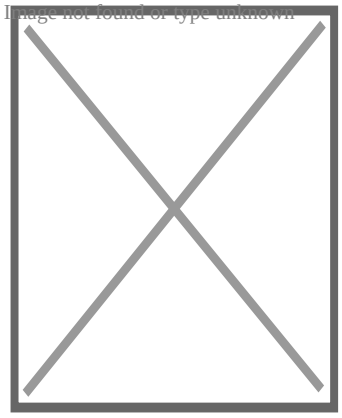
Child protection

[edit]
Further information: Child labor, Child labor laws, Risk aversion, Child abuse, and Protection of Children Act

Child protection, according to UNICEF, refers to "preventing and responding to violence, exploitation and abuse against children – including commercial sexual exploitation, trafficking, child labour and harmful traditional practices, such as female genital mutilation/cutting and child marriage".[50] The Convention on the Rights of the Child protects the fundamental rights of children.

Play

[edit]
Further information: Play (activity), Playground, Imaginary friend, and Childhood secret club



Dancing at Mother of Peace AIDs orphanage, Zimbabwe

Play is essential to the cognitive, physical, social, and emotional well-being of children.[51] It offers children opportunities for physical (running, jumping, climbing, etc.), intellectual (social skills, community norms, ethics and general knowledge) and emotional development (empathy, compassion, and friendships). Unstructured play encourages creativity and imagination. Playing and interacting with other children, as well as some adults, provides opportunities for friendships, social interactions, conflicts and resolutions. However, adults tend to (often mistakenly) assume that virtually all children's social activities can be understood as "play" and, furthermore, that children's play activities do not involve much skill or effort.[52][53][54][55]

It is through play that children at a very early age engage and interact in the world around them. Play allows children to create and explore a world they can master, conquering their fears while practicing adult roles, sometimes in conjunction with other children or adult caregivers.[51] Undirected play allows children to learn how to work in groups, to share, to negotiate, to resolve conflicts, and to learn self-advocacy skills. However, when play is controlled by adults, children acquiesce to adult rules and concerns and lose some of the benefits play offers them. This is especially true in developing creativity, leadership, and group skills.[51]

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Ralph Hedley, *The Tournament,* 1898. It depicts poorer boys playing outdoors in a rural part of the Northeast of England.

Play is considered to be very important to optimal child development that it has been recognized by the United Nations Commission on Human Rights as a right of every child.[11] Children who are being raised in a hurried and pressured style may limit the protective benefits they would gain from child-driven play.[51]

The initiation of play in a classroom setting allows teachers and students to interact through playfulness associated with a learning experience. Therefore, playfulness aids the interactions between adults and children in a learning environment. “Playful Structure” means to combine informal learning with formal learning to produce an effective learning experience for children at a young age.[56]

Even though play is considered to be the most important to optimal child development, the environment affects their play and therefore their development. Poor children confront widespread environmental inequities as they experience less social support, and their parents are less responsive and more authoritarian. Children from low income families are less likely to have access to books and computers which would enhance their development.[57]

Street culture

[edit]
Main articles: Children's street culture and Children's street games

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Children in front of a movie theatre, Toronto, 1920s.

Children's street culture refers to the cumulative culture created by young children and is sometimes referred to as their *secret world*. It is most common in children between the ages of seven and twelve. It is strongest in urban working class industrial districts where children are traditionally free to play out in the streets for long periods without supervision. It is invented and largely sustained by children themselves with little adult interference.

Young children's street culture usually takes place on quiet backstreets and pavements, and along routes that venture out into local parks, playgrounds, scrub and wasteland, and to local shops. It often imposes imaginative status on certain sections of the urban realm (local buildings, kerbs, street objects, etc.). Children designate specific areas that serve as informal meeting and relaxation places (see: Sobel, 2001). An urban area that looks faceless or neglected to an adult may have deep 'spirit of place' meanings in to children. Since the advent of indoor distractions such as video games, and television, concerns have been expressed about the vitality – or even the survival – of children's street culture.

Geographies of childhood

[edit]

The geographies of childhood involves how (adult) society perceives the idea of childhood, the many ways adult attitudes and behaviors affect children's lives, including the environment which surrounds children and its implications.[58]

The geographies of childhood is similar in some respects to children's geographies which examines the places and spaces in which children live.[59]

Nature deficit disorder

[edit]
Main article: Nature deficit disorder

Nature Deficit Disorder, a term coined by Richard Louv in his 2005 book *Last Child in the Woods,* refers to the trend in the United States and Canada towards less time for outdoor play,[60][61] resulting in a wide range of behavioral problems.[62]

With increasing use of cellphones, computers, video games and television, children have more reasons to stay inside rather than outdoors exploring. “The average American child spends 44 hours a week with electronic media”.[63] Research in 2007 has drawn a correlation between the declining number of National Park visits in the U.S. and increasing consumption of electronic media by children.[64] The media has accelerated the trend for children's nature disconnection by deemphasizing views of nature, as in

Disney films.[65]

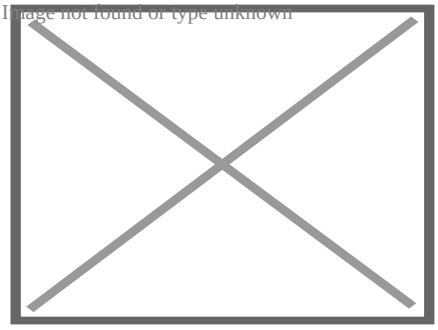
Age of responsibility

[edit]
Further information: Age of consent, Age of majority, Age of criminal responsibility, and Marriageable age

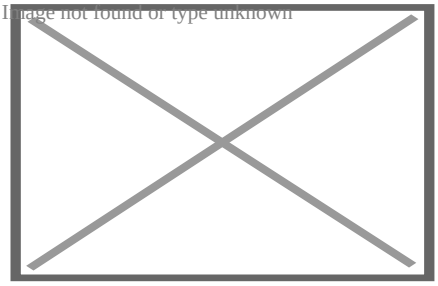
The age at which children are considered responsible for their society-bound actions (e. g. marriage, voting, etc.) has also changed over time,[66] and this is reflected in the way they are treated in courts of law. In Roman times, children were regarded as not culpable for crimes, a position later adopted by the Church. In the 19th century, children younger than seven years old were believed incapable of crime. Children from the age of seven forward were considered responsible for their actions. Therefore, they could face criminal charges, be sent to adult prison, and be punished like adults by whipping, branding or hanging. However, courts at the time would consider the offender's age when deliberating sentencing.[*citation needed*] Minimum employment age and marriage age also vary. The age limit of voluntary/involuntary military service is also disputed at the international level.[67]

Education

[edit]



Children in an outdoor classroom in Bié, Angola



Children seated in a Finnish classroom at the school of Torvinen in Sodankylä, Finland, in the 1920s

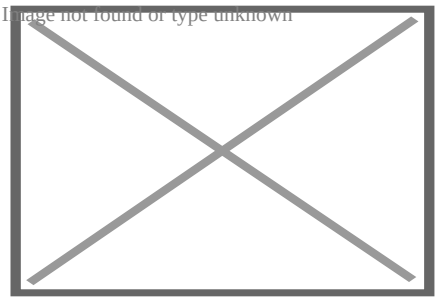
Main article: Education

Education, in the general sense, refers to the act or process of imparting or acquiring general knowledge, developing the powers of reasoning and judgment, and preparing intellectually for mature life.[68] Formal education most often takes place through schooling. A right to education has been recognized by some governments. At the global level, Article 13 of the United Nations' 1966 International Covenant on Economic, Social and Cultural Rights (ICESCR) recognizes the right of everyone to an education.[69] Education is compulsory in most places up to a certain age, but attendance at school may not be, with alternative options such as home-schooling or e-learning being recognized as valid forms of education in certain jurisdictions.

Children in some countries (especially in parts of Africa and Asia) are often kept out of school, or attend only for short periods. Data from UNICEF indicate that in 2011, 57 million children were out of school; and more than 20% of African children have never attended primary school or have left without completing primary education.[70] According to a UN report, warfare is preventing 28 million children worldwide from receiving an education, due to the risk of sexual violence and attacks in schools.[71] Other factors that keep children out of school include poverty, child labor, social attitudes, and long distances to school.[72][73]

Attitudes toward children

[edit]



Group of breaker boys in Pittston, Pennsylvania, 1911. Child labor was widespread until the early 20th century. In the 21st century, child labor rates are highest in Africa.

Social attitudes toward children differ around the world in various cultures and change over time. A 1988 study on European attitudes toward the centrality of children found that Italy was more child-centric and the Netherlands less child-centric, with other countries, such as Austria, Great Britain, Ireland and West Germany falling in between.[74]

Child marriage

[edit]

In 2013, child marriage rates of female children under the age of 18 reached 75% in Niger, 68% in Central African Republic and Chad, 66% in Bangladesh, and 47% in India.[75] According to a 2019 UNICEF report on child marriage, 37% of females were married before the age of 18 in sub-Saharan Africa, followed by South Asia at 30%. Lower levels were found in Latin America and Caribbean (25%), the Middle East and North Africa (18%), and Eastern Europe and Central Asia (11%), while rates in Western Europe and North America were minimal.[76] Child marriage is more prevalent with girls, but also involves boys. A 2018 study in the journal Vulnerable Children and Youth Studies found that, worldwide, 4.5% of males are married before age 18, with the Central African Republic having the highest average rate at 27.9%.[77]

Fertility and number of children per woman

[edit]

Before contraception became widely available in the 20th century, women had little choice other than abstinence or having often many children. In fact, current population growth concerns have only become possible with drastically reduced child mortality and sustained fertility. In 2017 the global total fertility rate was estimated to be 2.37 children per woman,[78] adding about 80 million people to the world population per year. In order to measure the total number of children, scientists often prefer the completed cohort fertility at age 50 years (CCF50).[78] Although the number of children is also influenced by cultural norms, religion, peer pressure and other social factors, the CCF50 appears to be most heavily dependent on the educational level of women, ranging from 5–8 children in women without education to less than 2 in women with 12 or more years of education.[78]

Issues

[edit]

Emergencies and conflicts

[edit]

See also: Declaration on the Protection of Women and Children in Emergency and Armed Conflict, Children in the Israeli–Palestinian conflict, Save the Children, Inter-Agency Network for Education in Emergencies, Military use of children, Trafficking of children, International child abduction, and Refugee children

Emergencies and conflicts pose detrimental risks to the health, safety, and well-being of children. There are many different kinds of conflicts and emergencies, e.g. wars and natural disasters. As of 2010 approximately 13 million children are displaced by armed conflicts and violence around the world.[79] Where violent conflicts are the norm, the lives of young children are significantly disrupted and their families have great difficulty in offering the sensitive and consistent care that young children need for their healthy development.[79] Studies on the effect of emergencies and conflict on the physical and mental health of children between birth and 8 years old show that where the disaster is natural, the rate of PTSD occurs in anywhere from 3 to 87 percent of affected children.[80] However, rates of PTSD for children living in chronic conflict conditions varies from 15 to 50 percent.[81][82]

Child protection

[edit]
This section is an excerpt from Child protection.[edit]

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Childcare

At home

- Parents
- Extended family
- Au pair
- Babysitter
- Governess
- Nanny

Outside the home

- Daycare
- Pre-school playgroup

Educational settings

- Early childhood education
- Homeschooling
- Pre-kindergarten
- Preschool
- Kindergarten
- Primary school

Institutions and standards

- Child protection
- *In loco parentis*
- Minor

Related

- Child abuse
- Child marriage
- Child Online Protection
- Family law
- Men in early childhood education
- Orphanage
- Parenting

Child protection (also called child welfare) is the safeguarding of children from violence, exploitation, abuse, abandonment, and neglect.[83][84][85][86] It involves identifying signs of potential harm. This includes responding to allegations or suspicions of abuse, providing support and services to protect children, and holding those who have harmed them accountable.[87]

The primary goal of child protection is to ensure that all children are safe and free from harm or danger.[86][88] Child protection also works to prevent future harm by creating policies and systems that identify and respond to risks before they lead to harm.[89]

In order to achieve these goals, research suggests that child protection services should be provided in a holistic way.[90][91][92] This means taking into account the social, economic, cultural, psychological, and environmental factors that can contribute to the risk of harm for individual children and their families. Collaboration across sectors and disciplines to create a comprehensive system of support and safety for children is required.[93][94]

It is the responsibility of individuals, organizations, and governments to ensure that children are protected from harm and their rights are respected.[95] This includes providing a safe environment for children to grow and develop, protecting them from physical, emotional and sexual abuse, and ensuring they have access to education, healthcare, and resources to fulfill their basic needs.[96]

Child protection systems are a set of services, usually government-run, designed to protect children and young people who are underage and to encourage family stability. UNICEF defines[97] a 'child protection system' as:

> "The set of laws, policies, regulations and services needed across all social sectors – especially social welfare, education, health, security and justice – to support prevention and response to protection-related risks. These systems are part of social protection, and extend beyond it. At the level of prevention, their aim includes supporting and strengthening families to reduce social exclusion, and to lower the risk of separation, violence and exploitation. Responsibilities are often spread across government agencies, with services delivered by local authorities, non-State providers, and community groups, making coordination between sectors and levels, including routine referral systems etc.., a necessary component of effective child protection systems."
>
> —Ã¢â‚¬Å *United Nations Economic and Social Council (2008), UNICEF Child Protection Strategy, E/ICEF/2008/5/Rev.1, par. 12–13.*

Under Article 19 of the UN Convention on the Rights of the Child, a 'child protection system' provides for the protection of children in and out of the home. One of the ways this can be enabled is through the provision of quality education, the fourth of the United Nations Sustainable Development Goals, in addition to other child protection systems. Some literature argues that child protection begins at conception; even how the conception took place can affect the child's development.[98]

Child abuse and child labor

[edit]

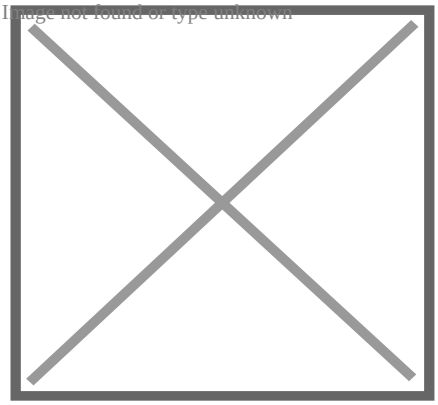
Protection of children from abuse is considered an important contemporary goal. This includes protecting children from exploitation such as child labor, child trafficking and child selling, child sexual abuse, including child prostitution and child pornography, military use of children, and child laundering in illegal adoptions. There exist several international instruments for these purposes, such as:

- Worst Forms of Child Labour Convention
- Minimum Age Convention, 1973
- Optional Protocol on the Sale of Children, Child Prostitution and Child Pornography
- Council of Europe Convention on the Protection of Children against Sexual Exploitation and Sexual Abuse
- Optional Protocol on the Involvement of Children in Armed Conflict
- Hague Adoption Convention

Climate change

[edit]

This section is an excerpt from Climate change and children.[edit]



A child at a climate demonstration in Juneau, Alaska

Children are more vulnerable to the effects of climate change than adults. The World Health Organization estimated that 88% of the existing global burden of disease caused by climate change affects children under five years of age.[99] A *Lancet* review on health and climate change lists children as the worst-affected category by climate change.[100] Children under 14 are 44 percent more likely to die from environmental factors,[101] and those in urban areas are disproportionately impacted by lower air quality and overcrowding.[102]

Children are physically more vulnerable to climate change in all its forms.[103] Climate change affects the physical health of children and their well-being. Prevailing inequalities, between and within countries, determine how climate change impacts children.[104] Children often have no voice in terms of global responses to climate change.[103]

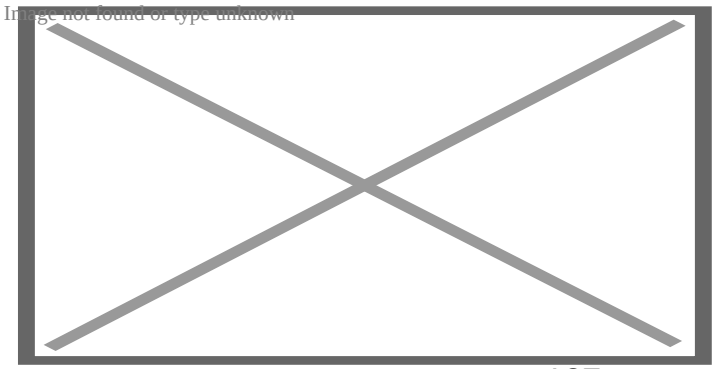
People living in low-income countries experience a higher burden of disease and are less capable of coping with climate change-related threats.[105] Nearly every child in the world is at risk from climate change and pollution, while almost half are at extreme risk.[106]

Health

[edit]

Child mortality

[edit]
Main articles: Child mortality and Infant mortality



World infant mortality rates in 2012.[107]

During the early 17th century in England, about two-thirds of all children died before the age of four.[108] During the Industrial Revolution, the life expectancy of children increased dramatically.[109] This has continued in England, and in the 21st century child mortality rates have fallen across the world. About 12.6 million under-five infants died worldwide in 1990, which declined to 6.6 million in 2012. The infant mortality rate dropped from 90 deaths per 1,000 live births in 1990, to 48 in 2012. The highest average infant mortality rates are in sub-Saharan Africa, at 98 deaths per 1,000 live births – over double the world's average.[107]

See also

[edit]
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- Outline of childhood
- Child slavery
- Childlessness
- Depression in childhood and adolescence
- One-child policy
- Religion and children
- Youth rights
- Archaeology of childhood

Sources

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Further reading

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Family

- History
- Household
- Nuclear family
- Extended family
- Conjugal family
- Immediate family
- Matrifocal family

First-degree relatives	○ Parent
	  ○ mother
	  ○ father
	○ Child
	  ○ son
	  ○ daughter
	○ Sibling
	  ○ brother
	  ○ sister

Second-degree relatives	○ Grandparent ○ Grandchild ○ Uncle/Aunt ○ Niece and nephew
Third-degree relatives	○ Great-grandparent ○ Great-grandchild ○ Great-uncle/Great-aunt ○ Cousin

Family-in-law	○ Spouse
	  ○ wife
	  ○ husband
	○ Parent-in-law
	○ Sibling-in-law
	○ Child-in-law
	  ○ daughter-in-law
	  ○ son-in-law

Stepfamily	○ Stepparent
	  ○ stepfather
	  ○ stepmother
	○ Stepchild
	○ Stepsibling

Kinship terminology

- Kinship
- Australian Aboriginal kinship
- Adoption
- Affinity
- Consanguinity
- Disownment
- Divorce
- Estrangement
- Family of choice
- Fictive kinship
- Marriage
- Nurture kinship
- Chinese kinship
- Hawaiian kinship
- Sudanese kinship
- Eskimo kinship
- Iroquois kinship
- Crow kinship
- Omaha kinship

Genealogy and lineage

- Bilateral descent
- Common ancestor
- Family name
- Heirloom
- Heredity
- Inheritance
- Lineal descendant
- collateral descent
- Matrilineality
- Patrilineality
- Progenitor
- Clan
- Royal descent

Family trees

- Pedigree chart
- Genogram
- Ahnentafel
  - Genealogical numbering systems
  - Seize quartiers
  - Quarters of nobility

Relationships

- Agape (parental love)
- Eros (marital love)
- Philia (brotherly love)
- Storge (familial love)
- Filial piety
- Polyfidelity
- Mother's Day
  - U.S.
- Father's Day
- Father–Daughter Day
- Siblings Day
- National Grandparents Day
- Parents' Day
- Children's Day
  - Japan
- Family Day
  - Canada
- American Family Day
- International Day of Families
- National Family Week
  - UK
- National Adoption Day
- Single parent
- Wedding anniversary
- Godparent
- Birth order
- Only child
- Middle child syndrome
- Sociology of the family
- Museum of Motherhood
- Astronaut family
- Dysfunctional family
- Domestic violence
- Incest
- Sibling abuse
- Sibling estrangement
- Sibling rivalry

Holidays

Related

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Development of the human body

Before birth

- Development
- Zygote
- Embryo
- Fetus
- Gestational age
- Birth

Birth and after

- Child development
  - Stages
  - Early
  - Puberty
- Adult development
- Ageing
- Senescence
- Death

Phases

- Early years
  - Infant
  - Toddler
  - Early childhood
  - Childhood
    - Child
- Youth
  - Preadolescence
  - Adolescence
  - Emerging adulthood
- Adulthood
  - Young adult
  - Middle adult
  - Elder adult
- Dying

Social and legal

- Minor
- Age of majority

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- **Recovery Factors That Affect Surgical Outcomes**
- **Incorporating New Tools for Patient Compliance**

Frequently Asked Questions

Do vibration devices reduce discomfort associated with orthodontic treatment?**

Vibration devices can help reduce discomfort associated with orthodontic treatment by enhancing the effectiveness of aligners and braces, and by providing gentle vibrational stimulation that can help seat aligners more effectively[2][3].

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