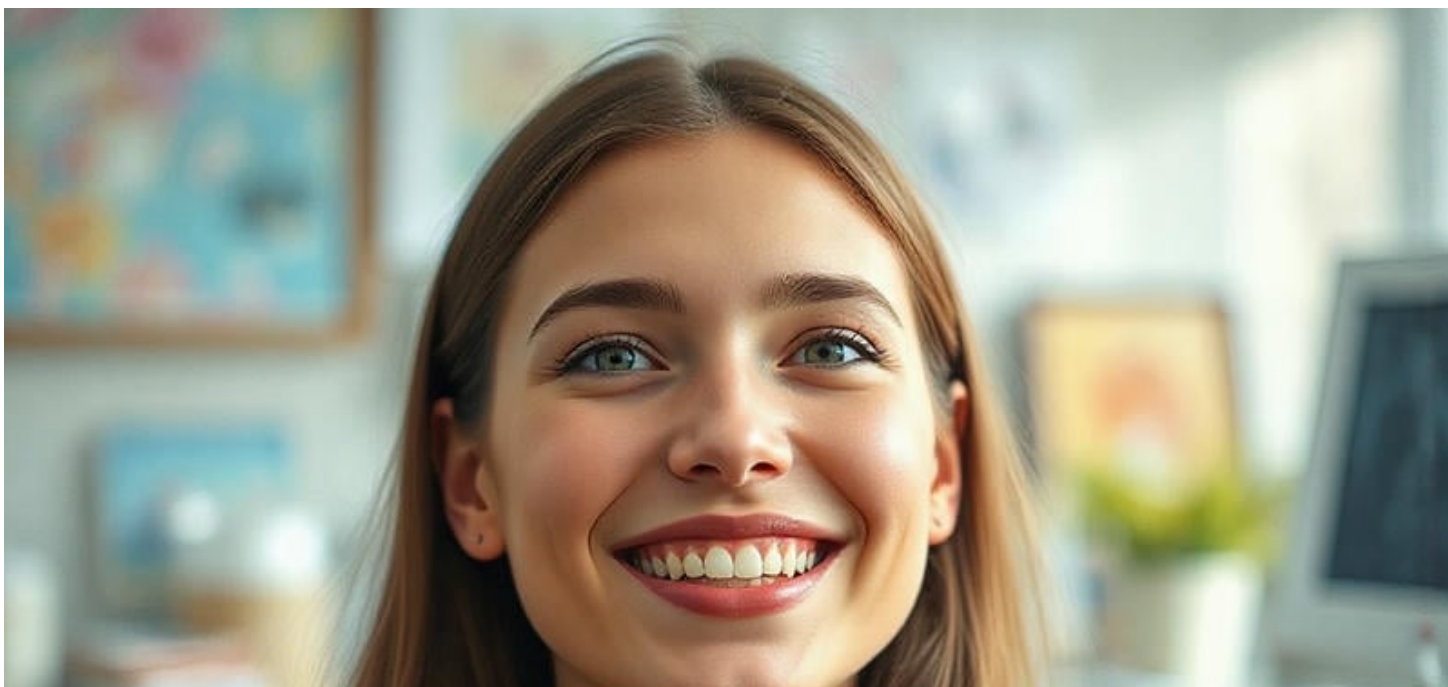


- **Linking Orthodontics with Periodontal Health**
Linking Orthodontics with Periodontal Health Coordinating with Oral Surgeons for Jaw Corrections Integrating Pediatric Dentistry for Early Intervention Combining Endodontic Care in Complex Cases Collaborative Planning with Prosthodontists Sharing Diagnostic Data Across Multiple Specialists Addressing Aesthetic and Functional Goals Together Communication Strategies Among Dental Teams Balancing Orthodontic Solutions and Restorative Needs Encouraging Holistic Treatment Approaches Managing Patients with Special Medical Conditions Efficient Referrals That Improve Patient Outcomes
- **AI Driven Aligners That Predict Movement**
AI Driven Aligners That Predict Movement Cloud Based Case Tracking for Efficient Management Digital Impressions That Replace Traditional Molds Virtual Consultations for Remote Care 3D Printing Applications in Orthodontic Appliances Teledentistry and Its Impact on Patient Convenience Software Innovations for Treatment Simulations Aligning Treatment Goals with Technological Advances Advantages of Using Digital Models in Planning Modern Approaches to Virtual Monitoring Reducing Errors Through Computerized Analysis The Future of Orthodontics in a Digital Era
- **About Us**



Okay, so you're thinking about how computers can help us mess up less in orthodontics, right? Makes perfect sense. Because honestly, traditional braces and all that jazz, while effective, are ripe for human error. Think about it.

One biggie is measurement. We're talking about tiny shifts, fractions of millimeters, and we're relying on analog tools – calipers, rulers, even just the good ol' eyeball test – to assess tooth positions and jaw relationships. It's just not precise enough sometimes. Misjudging a cephalometric landmark by a hair's breadth can throw off your whole treatment plan.

Retainers are often needed after braces to maintain alignment Dental braces for children patient.

Then there's the whole "transferring the plan to reality" thing. You've got your ideal tooth positions mapped out, maybe even in a study model. But then you're bending wires, cementing brackets, and relying on your own dexterity and experience to translate that plan into something tangible in the patient's mouth. Even the most skilled orthodontist can introduce variations at this stage. Brackets might be placed slightly off, wires might not engage perfectly, and suddenly you're chasing your tail trying to correct for those initial errors.

And let's not forget the subjective element. Interpreting X-rays, assessing facial aesthetics, deciding on the exact amount of force to apply – these are all things that can be influenced by personal biases and even just how tired you are that day. One orthodontist might see a need for extraction that another wouldn't. This inherent variability can lead to inconsistent treatment outcomes.

Finally, there's the issue of patient compliance. Even the best-laid plans can go awry if the patient isn't wearing their elastics, not cleaning their teeth properly, or breaking brackets left and right. While that's not *directly* the orthodontist's error, it's a factor that contributes to less-than-ideal results and underscores the need for accurate monitoring and adjustments.

So, yeah, traditional orthodontics, for all its successes, has its fair share of pitfalls. That's why the promise of computerized analysis to reduce these errors is so exciting. It's about bringing more precision, objectivity, and predictability to the whole process. Makes you wonder why we didn't jump on this bandwagon sooner, doesn't it?

Okay, let's talk about how computers are making things way more accurate when doctors are trying to figure out what's wrong with you and how to fix it. Think about it: doctors are human. They're brilliant, sure, but they can still get tired, miss subtle details, or even be influenced by personal biases without even realizing it. That's where computerized analysis comes in.

Imagine looking at an X-ray. A doctor might spot the obvious fracture, but a computer, trained on thousands of similar images, can pick up on the hairline cracks, the slight changes in bone density, things a human eye might easily overlook. This enhanced detail leads to a more precise diagnosis. We're talking about catching illnesses earlier, before they become really serious, or identifying the exact type of tumor so the right treatment can be started immediately.

And it's not just about finding problems, it's about planning solutions. Consider surgery. Instead of relying solely on experience and intuition, surgeons can now use computer models based on a patient's specific anatomy to simulate different surgical approaches. They can see exactly how each cut will impact the surrounding tissue, predict the outcome of different procedures, and ultimately choose the plan that's most likely to be successful and minimize risk. It's like rehearsing the surgery in a virtual world before even picking up a scalpel.

This isn't about replacing doctors, not at all. It's about giving them better tools, more information, and a safety net to catch potential errors. It's about combining the doctor's expertise and empathy with the computer's processing power and objectivity. The result? Fewer mistakes, better diagnoses, and treatment plans that are tailored specifically to you, leading to improved patient outcomes and a much better chance of getting you back on your feet. And that's something we can all appreciate.

*** Preventive measures to maintain periodontal health during orthodontic treatment.**

Okay, let's talk about how computers are helping us get things right in pediatric orthodontics – specifically, the cool tools they're bringing to the table. Think about it: little mouths are complex, and getting braces or aligners just right for kids is crucial for their long-term dental health. We're not just aiming for a pretty smile; we're talking about proper jaw development, bite function, and preventing future problems.

Now, traditionally, a lot of orthodontics relied on manual measurements and a skilled, but still human, eye. Errors could creep in, impacting treatment plans and outcomes. That's where these computerized

tools swoop in like digital superheroes.

We're talking about things like cone-beam computed tomography (CBCT), which gives us a detailed 3D view of the child's teeth and jaw. It's way more precise than traditional X-rays, allowing us to see exactly where teeth are positioned, assess bone structure, and identify any hidden issues. Then there are intraoral scanners, which create digital models of the teeth. No more messy impressions that kids hate! These digital models are incredibly accurate and can be manipulated on a computer screen to plan treatment with pinpoint precision.

And it doesn't stop there. Software programs analyze these scans and models, helping orthodontists predict tooth movement, design custom appliances like aligners or braces, and even simulate treatment outcomes. Think of it like a GPS for orthodontics, guiding us along the best path to a perfect smile.

Ultimately, these computerized tools aren't about replacing the orthodontist's expertise; they're about enhancing it. They provide more information, improve accuracy, and help us make better-informed decisions, all leading to fewer errors and better results for our young patients. It's about embracing technology to give kids the healthiest, happiest smiles possible.

*** The role of oral hygiene instructions for children and parental involvement.**

Okay, so let's talk about why getting rid of errors using computers in medicine is a big deal. Think about it: when doctors and nurses are working, they're making tons of decisions, constantly juggling information. Humans make mistakes, it's just part of the deal. But in healthcare, even small errors can have pretty serious consequences.

That's where computerized analysis comes in. Imagine a computer program that can double-check drug dosages, flag potential allergies, or even analyze medical images with incredible precision. Suddenly, you've got a safety net, a second set of eyes that's always on the lookout for slip-ups.

And here's the kicker: when you reduce those errors, you see some really cool benefits. First off, treatment times tend to get shorter. That's because things are done right the first time, avoiding the need for corrections, re-tests, or extra procedures. Less time in the hospital or clinic is a win for everyone.

But even more importantly, you get better outcomes. Think about it – fewer mistakes mean fewer complications, fewer side effects, and a greater chance that the treatment will actually work the way it's supposed to. Patients recover faster, they have a better quality of life, and ultimately, they're healthier. So, it's not just about being more efficient, it's about genuinely improving people's lives through the power of technology and careful analysis.

*** Early detection and management of periodontal problems during orthodontic care.**

Let's talk about how computers are helping us make fewer mistakes, shall we? I mean, we're all human, right? We mess up. But what if we could lean on our digital buddies to catch those errors before they become a real problem? That's where computerized analysis comes in, and honestly, the proof is in the pudding. Or rather, in the case studies.

Think about it. A hospital pharmacy, for example. Used to be, pharmacists were manually checking prescriptions, dosages, potential drug interactions. All day long, intense focus. But fatigue sets in, details get missed. Now, with computerized systems analyzing prescriptions, flagging potential issues

like allergies or dangerous combinations in milliseconds, the error rate plummets. We're talking about lives saved, folks. It's not just theoretical.

Or picture a manufacturing plant churning out complex components. Without computerized analysis, quality control relies heavily on human inspectors. They're good, sure, but they're still human. A tiny crack, a slight misalignment – it's easy to overlook. But a computerized vision system, analyzing each piece with laser precision, catches those flaws instantly. The result? Fewer defective products reaching the consumer, less waste, and a happier bottom line.

And it's not just giant industries. Even something as seemingly straightforward as accounting benefits massively. Spreadsheets are powerful, but prone to human error – a misplaced decimal point here, a wrong formula there, and suddenly the entire balance sheet is skewed. Computerized accounting software, constantly cross-referencing data and flagging inconsistencies, acts like a tireless, vigilant auditor, ensuring accuracy and minimizing the risk of financial misstatements.

These are just glimpses, snapshots really, of the transformative power of computerized analysis. It's not about replacing humans, not at all. It's about augmenting our abilities, freeing us from the drudgery of repetitive checks and allowing us to focus on higher-level thinking, on innovation, and on the things that truly require human intuition and judgment. By letting computers handle the meticulous analysis, we're simply becoming better, more accurate versions of ourselves. And that's something worth celebrating.

*** Collaboration between orthodontists and periodontists for optimal outcomes.**

Okay, so we're talking about using computers to catch mistakes, right? Sounds great in theory, like a digital safety net for all the little blunders that slip through the cracks when humans are doing the work.

But let's be real, fancy computer systems don't exactly grow on trees. They cost money, sometimes a *lot* of money. And that's where the concerns start creeping in, especially when we're talking about applying this stuff broadly.

Think about smaller clinics or hospitals, the ones already struggling to keep the lights on. Can they really afford the latest AI-powered error-detection software? Probably not. And if only the well-funded institutions can use these tools, what happens? We end up with a two-tiered system, where the rich get safer healthcare and everyone else... well, they're still relying on the same old, potentially error-prone methods. That's not exactly fair, is it?

Then there's the accessibility angle. It's not just about the initial price tag. These systems often require specialized training to use effectively. If your staff isn't comfortable with the technology, or if the interface is clunky and confusing, you're not going to see the benefits. You might even introduce *new* errors because people are struggling to navigate the system.

So, while computerized analysis is a promising way to reduce errors, we can't just blindly throw money at it. We need to think carefully about how to make these technologies affordable and user-friendly, so that everyone – regardless of their socioeconomic status or technical skills – can benefit from a safer, more accurate healthcare system. Otherwise, we're just widening the gap instead of closing it.

Okay, so, the future of computerized orthodontics for kids... It's kind of a big deal, right? When you think about it, traditional braces and stuff, it's a lot of guesswork, even with really skilled orthodontists. They're making judgments based on X-rays and plaster models, and while they're good at it, humans are still prone to, you know, human error.

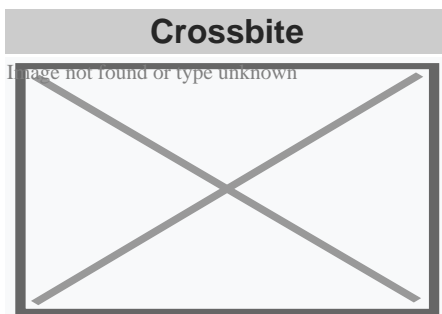
Now, imagine a world where a computer can analyze everything super precisely. We're talking about 3D scans of a child's mouth, sophisticated algorithms predicting tooth movement, and personalized treatment plans based on hard data, not just "what looks right." That's what computerized orthodontics

promises.

The coolest part, I think, is the potential to reduce errors. Think about it: fewer adjustments needed because the computer predicted exactly how things would shift. Less chance of overcorrection or undertreatment. And ultimately, that means shorter treatment times and happier kids who aren't stuck with braces forever.

Of course, it's not going to replace orthodontists entirely. These computer systems will be tools, powerful tools, in their hands. The expertise of the orthodontist is still crucial for interpreting the data and making the final decisions. But by leveraging the power of computers, we can make orthodontic treatment more accurate, more efficient, and ultimately, better for our kids. It's a pretty exciting prospect, really.

About crossbite



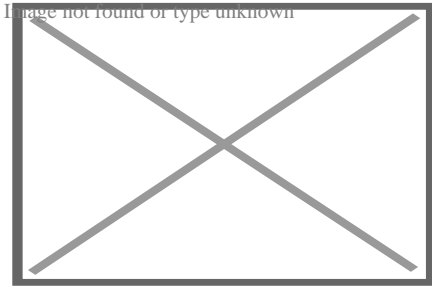
Unilateral posterior crossbite

Specialty Orthodontics

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

Anterior crossbite

[edit]



Class 1 with anterior crossbite

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

Primary/mixed dentitions

[edit]

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

Dental crossbite

[edit]

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

Single tooth crossbite

[edit]

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

Skeletal crossbite

[edit]

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

Posterior crossbite

[edit]

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

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

Connections with TMD

[edit]

Unilateral posterior crossbite

[edit]

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

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

Treatment

[edit]

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

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

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

Unilateral crossbites can also be diagnosed and treated properly by using a Deprogramming splint. This splint has flat occlusal surface which causes the muscles to deprogram themselves and

establish new sensory engrams. When the splint is removed, a proper centric relation bite can be diagnosed from the bite.^[19]

Self-correction

[edit]

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

See also

[edit]

- List of palatal expanders
- Palatal expansion
- Malocclusion

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[edit]

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External links

[edit]

Classification

- ICD-10: K07.2 ^D
- ICD-9-CM: 524.27

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Orthodontics

Diagnosis

- Bolton analysis
- Cephalometric analysis
- Cephalometry
- Dentition analysis
- Failure of eruption of teeth
- Little's Irregularity Index
- Malocclusion
- Scissor bite
- Standard anatomical position
- Tooth ankylosis
- Tongue thrust

Conditions

- Overbite
- Overjet
- Open bite
- Crossbite
- Dental crowding
- Dental spacing
- Bimaxillary Protrusion
- Prognathism
- Retrognathism
- Maxillary hypoplasia
- Condylar hyperplasia
- Overeruption
- Mouth breathing
- Temporomandibular 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

- Edward Angle
- Spencer Atkinson
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- Frederick Lester Stanton
- Earl Emanuel Shepard

Notable contributors

Organizations

- American Association of Orthodontists
- American Board of Orthodontics
- British Orthodontic Society
- Canadian Association of Orthodontists
- Indian Orthodontic Society
- Italian Academy of Orthodontic Technology
- Society for Orthodontic Dental Technology (Germany)

Journals

- American Journal of Orthodontics and Dentofacial Orthopedics
- The Angle Orthodontist
- Journal of Orthodontics

Institution

- Angle School of Orthodontia

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Dental disease involving the jaw

General

- Jaw abnormality
- malocclusion
- Orthodontics
- Gnathitis

Size

- Micrognathism
- Maxillary hypoplasia

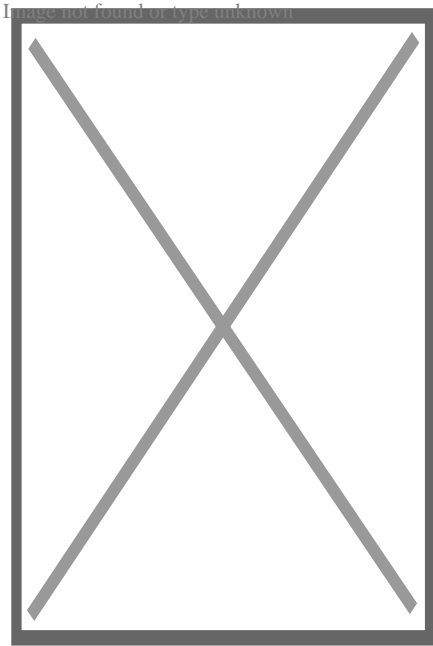
Maxilla and Mandible

- Cherubism
- Congenital epulis
- Torus mandibularis
- Torus palatinus

Other

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

Authority control databases: National          



A dentist treats a patient with the help of a dental assistant.

Occupation

Names

- Dentist
- Dental Surgeon
- Doctor

[¹][nb 1]

Occupation type

Profession

Activity sectors

Health care, Anatomy, Physiology, Pathology, Medicine, Pharmacology, Surgery

Description

Competencies

Education required

Dental Degree

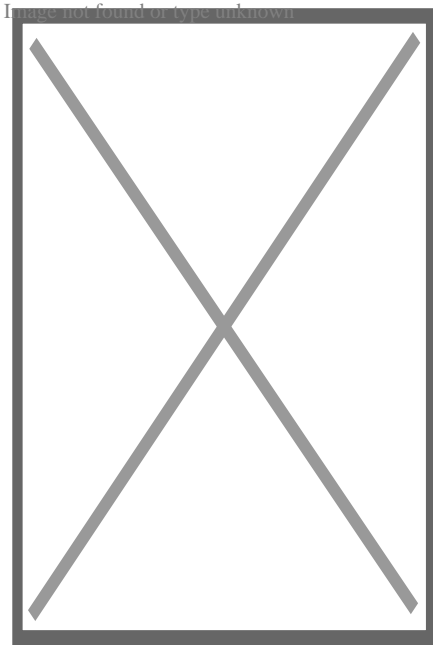
Fields of employment

Related jobs

ICD-9-CM 23-24

MeSH D003813

[edit on Wikidata]



An oral surgeon and dental assistant removing a wisdom tooth

Dentistry, also known as **dental medicine** and **oral medicine**, is the branch of medicine focused on the teeth, gums, and mouth. It consists of the study, diagnosis, prevention, management, and treatment of diseases, disorders, and conditions of the mouth, most commonly focused on dentition (the development and arrangement of teeth) as well as the oral mucosa.^[2] Dentistry may also encompass other aspects of the craniofacial complex including the temporomandibular joint. The practitioner is called a dentist.

The history of dentistry is almost as ancient as the history of humanity and civilization, with the earliest evidence dating from 7000 BC to 5500 BC.^[3] Dentistry is thought to have been the first specialization in medicine which has gone on to develop its own accredited degree with its own specializations.^[4] Dentistry is often also understood to subsume the now largely defunct medical specialty of stomatology (the study of the mouth and its disorders and diseases) for which reason the two terms are used interchangeably in certain regions. However, some specialties such as oral and maxillofacial surgery (facial reconstruction) may require both medical and dental degrees to accomplish. In European history, dentistry is considered to have stemmed from the trade of barber surgeons.^[5]

Dental treatments are carried out by a dental team, which often consists of a dentist and dental auxiliaries (such as dental assistants, dental hygienists, dental technicians, and dental therapists). Most dentists either work in private practices (primary care), dental hospitals, or (secondary care) institutions (prisons, armed forces bases, etc.).

The modern movement of evidence-based dentistry calls for the use of high-quality scientific research and evidence to guide decision-making such as in manual tooth conservation, use of fluoride water treatment and fluoride toothpaste, dealing with oral diseases such as tooth decay and periodontitis, as well as systematic diseases such as osteoporosis, diabetes, celiac disease, cancer, and HIV/AIDS which could also affect the oral cavity. Other practices relevant to evidence-based dentistry include radiology of the mouth to inspect teeth deformity or oral malaises,

haematology (study of blood) to avoid bleeding complications during dental surgery, cardiology (due to various severe complications arising from dental surgery with patients with heart disease), etc.

Terminology

[edit]

The term dentistry comes from *dentist*, which comes from French *dentiste*, which comes from the French and Latin words for tooth.^[6] The term for the associated scientific study of teeth is

odontology (from Ancient Greek:

ὀδόντος, lit. 'tooth') – the study of the structure, development, and abnormalities of the teeth.

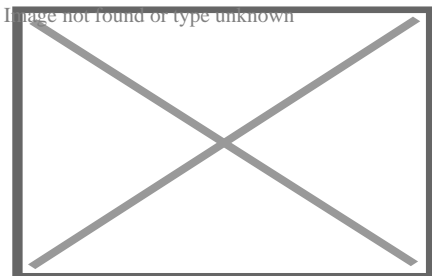
Dental treatment

[edit]

Dentistry usually encompasses practices related to the oral cavity.^[7] According to the World Health Organization, oral diseases are major public health problems due to their high incidence and prevalence across the globe, with the disadvantaged affected more than other socio-economic groups.^[8]

The majority of dental treatments are carried out to prevent or treat the two most common oral diseases which are dental caries (tooth decay) and periodontal disease (gum disease or pyorrhea). Common treatments involve the restoration of teeth, extraction or surgical removal of teeth, scaling and root planing, endodontic root canal treatment, and cosmetic dentistry.^[9]

By nature of their general training, dentists, without specialization can carry out the majority of dental treatments such as restorative (fillings, crowns, bridges), prosthetic (dentures), endodontic (root canal) therapy, periodontal (gum) therapy, and extraction of teeth, as well as performing examinations, radiographs (x-rays), and diagnosis. Dentists can also prescribe medications used in the field such as antibiotics, sedatives, and any other drugs used in patient management. Depending on their licensing boards, general dentists may be required to complete additional training to perform sedation, dental implants, etc.



Irreversible enamel defects caused by an untreated celiac disease. They may be the only clue to its diagnosis, even in absence of gastrointestinal symptoms, but are often

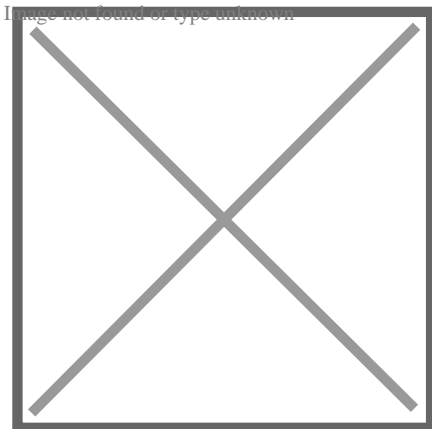
confused with fluorosis, tetracycline discoloration, acid reflux or other causes.^{[10][11][12]} The National Institutes of Health include a dental exam in the diagnostic protocol of celiac disease.^[10]

Dentists also encourage the prevention of oral diseases through proper hygiene and regular, twice or more yearly, checkups for professional cleaning and evaluation. Oral infections and inflammations may affect overall health and conditions in the oral cavity may be indicative of systemic diseases, such as osteoporosis, diabetes, celiac disease or cancer.^{[7][10][13][14]} Many studies have also shown that gum disease is associated with an increased risk of diabetes, heart disease, and preterm birth. The concept that oral health can affect systemic health and disease is referred to as "oral-systemic health".

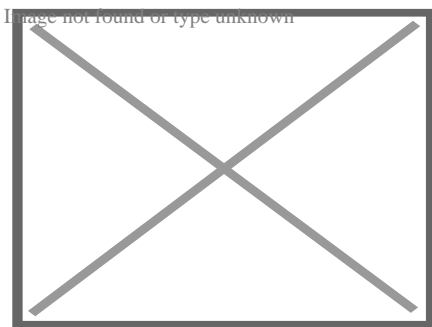
Education and licensing

[edit]

Main article: Dentistry throughout the world



A sagittal cross-section of a molar tooth; 1: crown, 2: root, 3: enamel, 4: dentin and dentin tubules, 5: pulp chamber, 6: blood vessels and nerve, 7: periodontal ligament, 8: apex and periapical region, 9: alveolar bone



Early dental chair in Pioneer West Museum in Shamrock, Texas

John M. Harris started the world's first dental school in Bainbridge, Ohio, and helped to establish dentistry as a health profession. It opened on 21 February 1828, and today is a dental museum.^[15] The first dental college, Baltimore College of Dental Surgery, opened in Baltimore, Maryland, US in 1840. The second in the United States was the Ohio College of Dental Surgery, established in

Cincinnati, Ohio, in 1845.^[16] The Philadelphia College of Dental Surgery followed in 1852.^[17] In 1907, Temple University accepted a bid to incorporate the school.

Studies show that dentists that graduated from different countries,^[18] or even from different dental schools in one country,^[19] may make different clinical decisions for the same clinical condition. For example, dentists that graduated from Israeli dental schools may recommend the removal of asymptomatic impacted third molar (wisdom teeth) more often than dentists that graduated from Latin American or Eastern European dental schools.^[20]

In the United Kingdom, the first dental schools, the London School of Dental Surgery and the Metropolitan School of Dental Science, both in London, opened in 1859.^[21] The British Dentists Act of 1878 and the 1879 Dentists Register limited the title of "dentist" and "dental surgeon" to qualified and registered practitioners.^{[22][23]} However, others could legally describe themselves as "dental experts" or "dental consultants".^[24] The practice of dentistry in the United Kingdom became fully regulated with the 1921 Dentists Act, which required the registration of anyone practising dentistry.^[25] The British Dental Association, formed in 1880 with Sir John Tomes as president, played a major role in prosecuting dentists practising illegally.^[22] Dentists in the United Kingdom are now regulated by the General Dental Council.

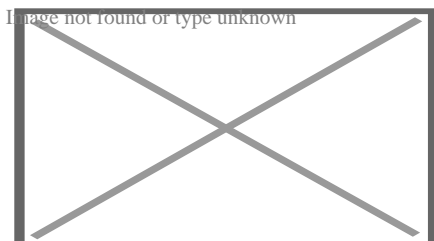
In many countries, dentists usually complete between five and eight years of post-secondary education before practising. Though not mandatory, many dentists choose to complete an internship or residency focusing on specific aspects of dental care after they have received their dental degree. In a few countries, to become a qualified dentist one must usually complete at least four years of postgraduate study;^[26] Dental degrees awarded around the world include the Doctor of Dental Surgery (DDS) and Doctor of Dental Medicine (DMD) in North America (US and Canada), and the Bachelor of Dental Surgery/Baccalaureus Dentalis Chirurgiae (BDS, BDent, BChD, BDS_c) in the UK and current and former British Commonwealth countries.

All dentists in the United States undergo at least three years of undergraduate studies, but nearly all complete a bachelor's degree. This schooling is followed by four years of dental school to qualify as a "Doctor of Dental Surgery" (DDS) or "Doctor of Dental Medicine" (DMD). Specialization in dentistry is available in the fields of Anesthesiology, Dental Public Health, Endodontics, Oral Radiology, Oral and Maxillofacial Surgery, Oral Medicine, Orofacial Pain, Pathology, Orthodontics, Pediatric Dentistry (Pedodontics), Periodontics, and Prosthodontics^[27]

Specialties

[edit]

Main article: Specialty (dentistry)



A modern dental clinic in Lappeenranta, Finland

Some dentists undertake further training after their initial degree in order to specialize. Exactly which subjects are recognized by dental registration bodies varies according to location. Examples include:

- Anesthesiology^[28] – The specialty of dentistry that deals with the advanced use of general anesthesia, sedation and pain management to facilitate dental procedures.
- Cosmetic dentistry – Focuses on improving the appearance of the mouth, teeth and smile.
- Dental public health – The study of epidemiology and social health policies relevant to oral health.
- Endodontics (also called *endodontology*) – Root canal therapy and study of diseases of the dental pulp and periapical tissues.
- Forensic odontology – The gathering and use of dental evidence in law. This may be performed by any dentist with experience or training in this field. The function of the forensic dentist is primarily documentation and verification of identity.
- Geriatric dentistry or *geriodontics* – The delivery of dental care to older adults involving the diagnosis, prevention, and treatment of problems associated with normal aging and age-related diseases as part of an interdisciplinary team with other health care professionals.
- Oral and maxillofacial pathology – The study, diagnosis, and sometimes the treatment of oral and maxillofacial related diseases.
- Oral and maxillofacial radiology – The study and radiologic interpretation of oral and maxillofacial diseases.
- Oral and maxillofacial surgery (also called *oral surgery*) – Extractions, implants, and surgery of the jaws, mouth and face.^[nb 2]
- Oral biology – Research in dental and craniofacial biology
- Oral Implantology – The art and science of replacing extracted teeth with dental implants.
- Oral medicine – The clinical evaluation and diagnosis of oral mucosal diseases
- Orthodontics and dentofacial orthopedics – The straightening of teeth and modification of midface and mandibular growth.
- Pediatric dentistry (also called *pedodontics*) – Dentistry for children
- Periodontology (also called *periodontics*) – The study and treatment of diseases of the periodontium (non-surgical and surgical) as well as placement and maintenance of dental implants
- Prosthodontics (also called *prosthetic dentistry*) – Dentures, bridges and the restoration of implants.
 - Some prosthodontists super-specialize in maxillofacial prosthetics, which is the discipline originally concerned with the rehabilitation of patients with congenital facial and oral defects such as cleft lip and palate or patients born with an underdeveloped ear (microtia). Today, most maxillofacial prosthodontists return function and esthetics to patients with acquired defects secondary to surgical removal of head and neck tumors, or secondary to trauma from war or motor vehicle accidents.
- Special needs dentistry (also called *special care dentistry*) – Dentistry for those with developmental and acquired disabilities.
- Sports dentistry – the branch of sports medicine dealing with prevention and treatment of dental injuries and oral diseases associated with sports and exercise.^[29] The sports dentist

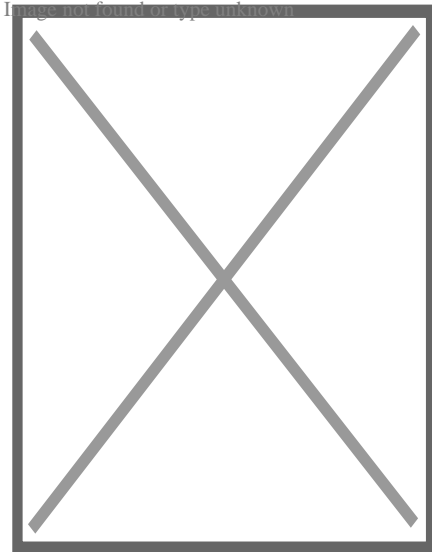
works as an individual consultant or as a member of the Sports Medicine Team.

- o Veterinary dentistry – The field of dentistry applied to the care of animals. It is a specialty of veterinary medicine.^{[30][31]}

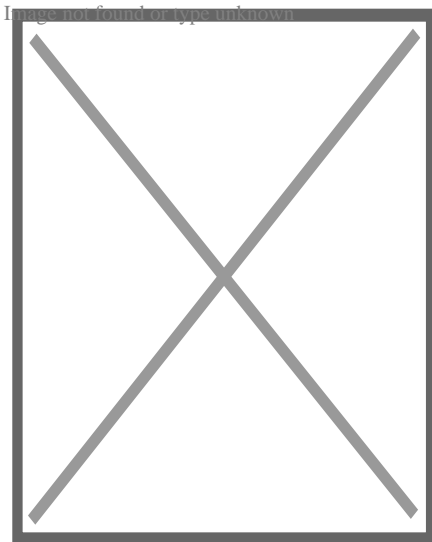
History

[edit]

See also: History of dental treatments



A wealthy patient falling over because of having a tooth extracted with such vigour by a fashionable dentist, c. 1790. History of Dentistry.



Farmer at the dentist, Johann Liss, c. 1616–17

Tooth decay was low in pre-agricultural societies, but the advent of farming society about 10,000 years ago correlated with an increase in tooth decay (cavities).^[32] An infected tooth from Italy partially cleaned with flint tools, between 13,820 and 14,160 years old, represents the oldest known dentistry,^[33] although a 2017 study suggests that 130,000 years ago the Neanderthals

already used rudimentary dentistry tools.^[34] In Italy evidence dated to the Paleolithic, around 13,000 years ago, points to bitumen used to fill a tooth^[35] and in Neolithic Slovenia, 6500 years ago, beeswax was used to close a fracture in a tooth.^[36] The Indus valley has yielded evidence of dentistry being practised as far back as 7000 BC, during the Stone Age.^[37] The Neolithic site of Mehrgarh (now in Pakistan's south western province of Balochistan) indicates that this form of dentistry involved curing tooth related disorders with bow drills operated, perhaps, by skilled bead-crafters.^[3] The reconstruction of this ancient form of dentistry showed that the methods used were reliable and effective.^[38] The earliest dental filling, made of beeswax, was discovered in Slovenia and dates from 6500 years ago.^[39] Dentistry was practised in prehistoric Malta, as evidenced by a skull which had a dental abscess lanced from the root of a tooth dating back to around 2500 BC.^[40]

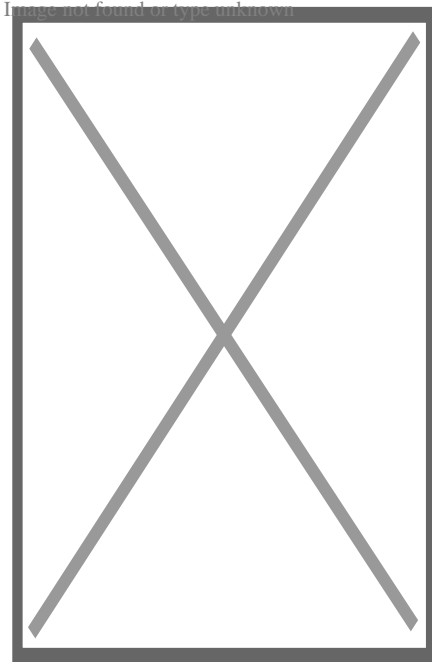
An ancient Sumerian text describes a "tooth worm" as the cause of dental caries.^[41] Evidence of this belief has also been found in ancient India, Egypt, Japan, and China. The legend of the worm is also found in the *Homeric Hymns*,^[42] and as late as the 14th century AD the surgeon Guy de Chauliac still promoted the belief that worms cause tooth decay.^[43]

Recipes for the treatment of toothache, infections and loose teeth are spread throughout the Ebers Papyrus, Kahun Papyri, Brugsch Papyrus, and Hearst papyrus of Ancient Egypt.^[44] The Edwin Smith Papyrus, written in the 17th century BC but which may reflect previous manuscripts from as early as 3000 BC, discusses the treatment of dislocated or fractured jaws.^{[44][45]} In the 18th century BC, the Code of Hammurabi referenced dental extraction twice as it related to punishment.^[46] Examination of the remains of some ancient Egyptians and Greco-Romans reveals early attempts at dental prosthetics.^[47] However, it is possible the prosthetics were prepared after death for aesthetic reasons.^[44]

Ancient Greek scholars Hippocrates and Aristotle wrote about dentistry, including the eruption pattern of teeth, treating decayed teeth and gum disease, extracting teeth with forceps, and using wires to stabilize loose teeth and fractured jaws.^[48] Use of dental appliances, bridges and dentures was applied by the Etruscans in northern Italy, from as early as 700 BC, of human or other animal teeth fastened together with gold bands.^{[49][50][51]} The Romans had likely borrowed this technique by the 5th century BC.^{[50][52]} The Phoenicians crafted dentures during the 6th–4th century BC, fashioning them from gold wire and incorporating two ivory teeth.^[53] In ancient Egypt, Hesy-Ra is the first named "dentist" (greatest of the teeth). The Egyptians bound replacement teeth together with gold wire. Roman medical writer Cornelius Celsus wrote extensively of oral diseases as well as dental treatments such as narcotic-containing emollients and astringents.^[54] The earliest dental amalgams were first documented in a Tang dynasty medical text written by the Chinese physician Su Kung in 659, and appeared in Germany in 1528.^{[55][56]}

During the Islamic Golden Age Dentistry was discussed in several famous books of medicine such as *The Canon in medicine* written by Avicenna and *Al-Tasreef* by Al-Zahrawi who is considered the greatest surgeon of the Middle Ages.^[57] Avicenna said that jaw fracture should be reduced according to the occlusal guidance of the teeth; this principle is still valid in modern times. Al-Zahrawi invented over 200 surgical tools that resemble the modern kind.^[58]

Historically, dental extractions have been used to treat a variety of illnesses. During the Middle Ages and throughout the 19th century, dentistry was not a profession in itself, and often dental procedures were performed by barbers or general physicians. Barbers usually limited their practice to extracting teeth which alleviated pain and associated chronic tooth infection. Instruments used for dental extractions date back several centuries. In the 14th century, Guy de Chauliac most probably invented the dental pelican^[59] (resembling a pelican's beak) which was used to perform dental extractions up until the late 18th century. The pelican was replaced by the dental key^[60] which, in turn, was replaced by modern forceps in the 19th century.^[61]



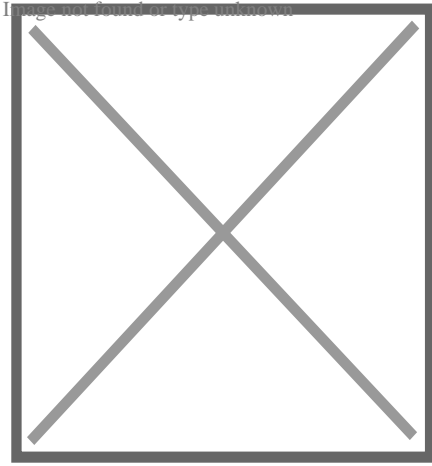
Dental needle-nose pliers designed by Fauchard in the late 17th century to use in prosthodontics

The first book focused solely on dentistry was the "Artzney Buchlein" in 1530^[48] and the first dental textbook written in English was called "Operator for the Teeth" by Charles Allen in 1685^[23]

In the United Kingdom, there was no formal qualification for the providers of dental treatment until 1859 and it was only in 1921 that the practice of dentistry was limited to those who were professionally qualified. The Royal Commission on the National Health Service in 1979 reported that there were then more than twice as many registered dentists per 10,000 population in the UK than there were in 1921.^[62]

Modern dentistry

[edit]

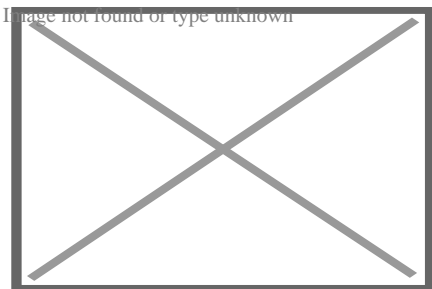


A microscopic device used in dental analysis, c. 1907

It was between 1650 and 1800 that the science of modern dentistry developed. The English physician Thomas Browne in his *A Letter to a Friend* (c. 1656 pub. 1690) made an early dental observation with characteristic humour:

The Egyptian Mummies that I have seen, have had their Mouths open, and somewhat gaping, which affordeth a good opportunity to view and observe their Teeth, wherein 'tis not easie to find any wanting or decayed: and therefore in Egypt, where one Man practised but one Operation, or the Diseases but of single Parts, it must needs be a barren Profession to confine unto that of drawing of Teeth, and little better than to have been Tooth-drawer unto King Pyrrhus, who had but two in his Head.

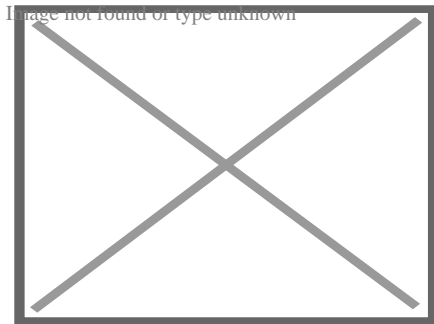
The French surgeon Pierre Fauchard became known as the "father of modern dentistry". Despite the limitations of the primitive surgical instruments during the late 17th and early 18th century, Fauchard was a highly skilled surgeon who made remarkable improvisations of dental instruments, often adapting tools from watchmakers, jewelers and even barbers, that he thought could be used in dentistry. He introduced dental fillings as treatment for dental cavities. He asserted that sugar-derived acids like tartaric acid were responsible for dental decay, and also suggested that tumors surrounding the teeth and in the gums could appear in the later stages of tooth decay.^{[63][64]}



Panoramic radiograph of historic dental implants, made 1978

Fauchard was the pioneer of dental prosthesis, and he invented many methods to replace lost teeth. He suggested that substitutes could be made from carved blocks of ivory or bone. He also introduced dental braces, although they were initially made of gold, he discovered that the teeth position could be corrected as the teeth would follow the pattern of the wires. Waxed linen or silk

threads were usually employed to fasten the braces. His contributions to the world of dental science consist primarily of his 1728 publication *Le chirurgien dentiste* or *The Surgeon Dentist*. The French text included "basic oral anatomy and function, dental construction, and various operative and restorative techniques, and effectively separated dentistry from the wider category of surgery".^[63]^[64]



A modern dentist's chair

After Fauchard, the study of dentistry rapidly expanded. Two important books, *Natural History of Human Teeth* (1771) and *Practical Treatise on the Diseases of the Teeth* (1778), were published by British surgeon John Hunter. In 1763, he entered into a period of collaboration with the London-based dentist James Spence. He began to theorise about the possibility of tooth transplants from one person to another. He realised that the chances of a successful tooth transplant (initially, at least) would be improved if the donor tooth was as fresh as possible and was matched for size with the recipient. These principles are still used in the transplantation of internal organs. Hunter conducted a series of pioneering operations, in which he attempted a tooth transplant. Although the donated teeth never properly bonded with the recipients' gums, one of Hunter's patients stated that he had three which lasted for six years, a remarkable achievement for the period.^[65]

Major advances in science were made in the 19th century, and dentistry evolved from a trade to a profession. The profession came under government regulation by the end of the 19th century. In the UK, the Dentist Act was passed in 1878 and the British Dental Association formed in 1879. In the same year, Francis Brodie Imlach was the first ever dentist to be elected President of the Royal College of Surgeons (Edinburgh), raising dentistry onto a par with clinical surgery for the first time.^[66]

Hazards in modern dentistry

[edit]

Main article: Occupational hazards in dentistry

Long term occupational noise exposure can contribute to permanent hearing loss, which is referred to as noise-induced hearing loss (NIHL) and tinnitus. Noise exposure can cause excessive stimulation of the hearing mechanism, which damages the delicate structures of the inner ear.^[67] NIHL can occur when an individual is exposed to sound levels above 90 dBA

according to the Occupational Safety and Health Administration (OSHA). Regulations state that the permissible noise exposure levels for individuals is 90 dBA.^[68] For the National Institute for Occupational Safety and Health (NIOSH), exposure limits are set to 85 dBA. Exposures below 85 dBA are not considered to be hazardous. Time limits are placed on how long an individual can stay in an environment above 85 dBA before it causes hearing loss. OSHA places that limitation at 8 hours for 85 dBA. The exposure time becomes shorter as the dBA level increases.

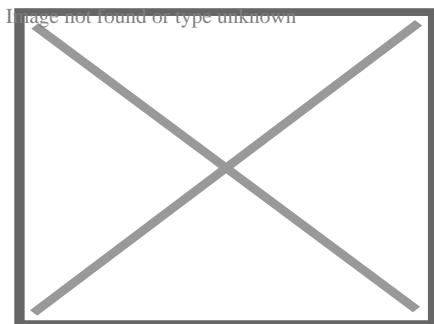
Within the field of dentistry, a variety of cleaning tools are used including piezoelectric and sonic scalers, and ultrasonic scalers and cleaners.^[69] While a majority of the tools do not exceed 75 dBA,^[70] prolonged exposure over many years can lead to hearing loss or complaints of tinnitus.^[71] Few dentists have reported using personal hearing protective devices,^[72]^[73] which could offset any potential hearing loss or tinnitus.

Evidence-based dentistry

[edit]

Main article: Evidence-based dentistry

There is a movement in modern dentistry to place a greater emphasis on high-quality scientific evidence in decision-making. Evidence-based dentistry (EBD) uses current scientific evidence to guide decisions. It is an approach to oral health that requires the application and examination of relevant scientific data related to the patient's oral and medical health. Along with the dentist's professional skill and expertise, EBD allows dentists to stay up to date on the latest procedures and patients to receive improved treatment. A new paradigm for medical education designed to incorporate current research into education and practice was developed to help practitioners provide the best care for their patients.^[74] It was first introduced by Gordon Guyatt and the Evidence-Based Medicine Working Group at McMaster University in Ontario, Canada in the 1990s. It is part of the larger movement toward evidence-based medicine and other evidence-based practices, especially since a major part of dentistry involves dealing with oral and systemic diseases. Other issues relevant to the dental field in terms of evidence-based research and evidence-based practice include population oral health, dental clinical practice, tooth morphology etc.



A dental chair at the University of Michigan School of Dentistry

Ethical and medicolegal issues

[edit]

Dentistry is unique in that it requires dental students to have competence-based clinical skills that can only be acquired through supervised specialized laboratory training and direct patient care^[75] This necessitates the need for a scientific and professional basis of care with a foundation of extensive research-based education.^[76] According to some experts, the accreditation of dental schools can enhance the quality and professionalism of dental education.^[77]^[78]

See also

[edit]

- icon Image of a medicine portal
 - Medicine portal
- Dental aerosol
- Dental instrument
- Dental public health
- Domestic healthcare:
 - Dentistry in ancient Rome
 - Dentistry in Canada
 - Dentistry in the Philippines
 - Dentistry in Israel
 - Dentistry in the United Kingdom
 - Dentistry in the United States
- Eco-friendly dentistry
- Geriatric dentistry
- List of dental organizations
- Pediatric dentistry
- Sustainable dentistry
- Veterinary dentistry

Notes

[edit]

- [^] Whether Dentists are referred to as "Doctor" is subject to geographic variation. For example, they are called "Doctor" in the US. In the UK, dentists have traditionally been referred to as "Mister" as they identified themselves with barber surgeons more than physicians (as do surgeons in the UK, see Surgeon#Titles). However more UK dentists now refer to themselves as "Doctor", although this was considered to be potentially misleading by the British public in a single report (see Costley and Fawcett 2010).

2. ^ The scope of oral and maxillofacial surgery is variable. In some countries, both a medical and dental degree is required for training, and the scope includes head and neck oncology and craniofacial deformity.

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Dentistry

Specialties

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

Dental surgery

- Dental extraction
- Tooth filling
- Root canal therapy
- Root end surgery
- Scaling and root planing
- Teeth cleaning
- Dental bonding
- Tooth polishing
- Tooth bleaching
- Socket preservation
- Dental implant

Organisations

- American Association of Orthodontists
- British Dental Association
- British Dental Health Foundation
- British Orthodontic Society
- Canadian Association of Orthodontists
- Dental Technologists Association
- General Dental Council
- Indian Dental Association
- National Health Service

- By country**
- Canada
 - Philippines
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 - United States

- See also**
- Index of oral health and dental articles
 - Outline of dentistry and oral health
 - Dental fear
 - Dental instruments
 - Dental material
 - History of dental treatments
 - Ancient Rome
 - Infant oral mutilation
 - Mouth assessment
 - Oral hygiene

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Cleft lip and cleft palate

- Related specialities**
- Advance practice nursing
 - Audiology
 - Dentistry
 - Dietetics
 - Genetics
 - Oral and maxillofacial surgery
 - Orthodontics
 - Orthodontic technology
 - Otolaryngology
 - Pediatrics
 - Pediatric dentistry
 - Physician
 - Plastic surgery
 - Psychiatry
 - Psychology
 - Respiratory therapy
 - Social work
 - Speech and language therapy

Related syndromes

- Hearing loss with craniofacial syndromes
- Pierre Robin syndrome
- Popliteal pterygium syndrome
- Van der Woude syndrome

National and international organisations

- Cleft Lip and Palate Association
- Craniofacial Society of Great Britain and Ireland
- Interplast
- North Thames Regional Cleft Lip and Palate Service
- Operation Smile
- Overseas Plastic Surgery Appeal
- Shriners Hospitals for Children
- Smile Train
- Transforming Faces Worldwide
- Smile Angel Foundation (China)

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Dental schools

**American
dental
schools**

- UAB
- Arizona
- Augusta (DCG)
- Boston U (Goldman)
- California (UCLA, UCSF)
- Case Western Reserve
- Colorado
- Columbia
- Connecticut
- Creighton
- Detroit Mercy
- East Carolina
- Florida
- Harvard
- Howard
- Illinois–Chicago
- Indiana
- Iowa
- Kentucky
- Lake Erie
- Loma Linda
- Louisville
- LSU Health–New Orleans
- Marquette
- Maryland–Baltimore
- Meharry
- Michigan
- Midwestern
- Minnesota
- Mississippi
- Missouri–Kansas City
- Nebraska–Medical Center
- Nevada–Las Vegas
- New England
- NYU
- SUNY (Buffalo, Stony Brook)
- North Carolina
- Nova
- Ohio State
- Oklahoma
- Oregon
- Pacific (Dugoni)

- Penn
- Pitt
- Puerto Rico
- Rochester
- Pacific Northwest
- Rutgers

**Defunct
American
dental
schools**

- Emory
- Fairleigh Dickinson
- Georgetown
- Harris
- Loyola
- Northwestern
- Ohio College
- Oral Roberts
- Pennsylvania College
- Wash U

**Canadian
dental
schools**

- Alberta
- British Columbia
- Dalhousie
- Laval
- Manitoba
- McGill
- Montréal
- Saskatchewan
- Toronto
- Western

**British
dental
schools**

- Aberdeen
- Barts and The London School of Medicine and Dentistry
- Glasgow
- Guy's, King's & St Thomas's
- Liverpool
- Newcastle
- Peninsula College of Medicine and Dentistry
- UCL Eastman Dental Institute

**Australian
and New
Zealand
dental
schools**

- Sydney
- Melbourne
- Adelaide
- Charles Sturt University
- Griffith University
- James Cook
- La Trobe
- Queensland
- Western Australia
- University of Otago

**South
Korean
dental
schools**

- Chonbuk
- Chonnam
- Chosun
- Dankook
- Gangneung-Wonju
- Kyung Hee
- Kyungpook
- Pusan
- Seoul
- Wonkwang
- Yonsei

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Medicine

Surgery

- Cardiac surgery
- Cardiothoracic surgery
- Endocrine surgery
- Eye surgery
- General surgery
 - Colorectal surgery
 - Digestive system surgery
- Neurosurgery
- Oral and maxillofacial surgery
- Orthopedic surgery
- Hand surgery
- Otolaryngology
 - ENT
- Pediatric surgery
- Plastic surgery
- Reproductive surgery
- Surgical oncology
- Transplant surgery
- Trauma surgery
- Urology
 - Andrology
- Vascular surgery

Internal medicine

- Allergy / Immunology
- Angiology
- Cardiology
- Endocrinology
- Gastroenterology
 - Hepatology
- Geriatrics
- Hematology
- Hospital medicine
- Infectious diseases
- Nephrology
- Oncology
- Pulmonology
- Rheumatology

Obstetrics and gynaecology

- Gynaecology
- Gynecologic oncology
- Maternal–fetal medicine
- Obstetrics
- Reproductive endocrinology and infertility
- Urogynecology






- Radiology

Medical education

- Medical school
- Bachelor of Medicine, Bachelor of Surgery
- Bachelor of Medical Sciences
- Master of Medicine
- Master of Surgery
- Doctor of Medicine
- Doctor of Osteopathic Medicine
- MD–PhD
 - Medical Scientist Training Program

Related topics

- Alternative medicine
- Allied health
- Molecular oncology
- Nanomedicine
- Personalized medicine
- Public health
- Rural health
- Therapy
- Traditional medicine
- Veterinary medicine
- Physician
 - Chief physician
- History of medicine

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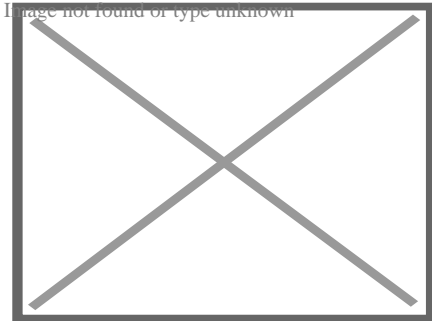
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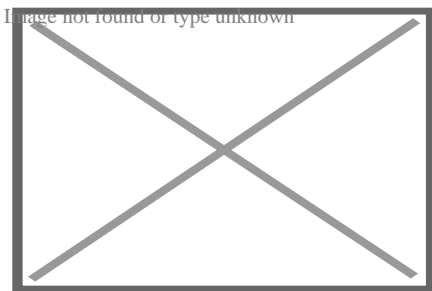
About thumb sucking

For other uses, see Thumbsucker (disambiguation).



Infants may use pacifiers or their thumb or fingers to soothe themselves

Newborn baby thumb sucking



A bonnet macaque thumb sucking

Thumb sucking is a behavior found in humans, chimpanzees, captive ring-tailed lemurs,^[1] and other primates.^[2] It usually involves placing the thumb into the mouth and rhythmically repeating sucking contact for a prolonged duration. It can also be accomplished with any organ within reach (such as other fingers and toes) and is considered to be soothing and therapeutic for the person. As a child develops the habit, it will usually develop a "favourite" finger to suck on.

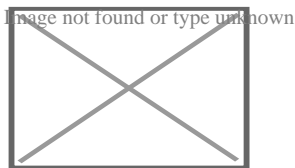
At birth, a baby will reflexively suck any object placed in its mouth; this is the sucking reflex responsible for breastfeeding. From the first time they engage in nutritive feeding, infants learn that the habit can not only provide valuable nourishment, but also a great deal of pleasure, comfort, and warmth. Whether from a mother, bottle, or pacifier, this behavior, over time, begins to become associated with a very strong, self-soothing, and pleasurable oral sensation. As the child grows older, and is eventually weaned off the nutritional sucking, they can either develop alternative means for receiving those same feelings of physical and emotional fulfillment, or they can continue experiencing those pleasantly soothing experiences by beginning to suck their thumbs or fingers.^[3]

] This reflex disappears at about 4 months of age; thumb sucking is not purely an instinctive behavior and therefore can last much longer.^[4] Moreover, ultrasound scans have revealed that thumb sucking can start before birth, as early as 15 weeks from conception; whether this behavior is voluntary or due to random movements of the fetus in the womb is not conclusively known.

Thumb sucking generally stops by the age of 4 years. Some older children will retain the habit, which can cause severe dental problems.^[5] While most dentists would recommend breaking the habit as early as possible, it has been shown that as long as the habit is broken before the onset of permanent teeth, at around 5 years old, the damage is reversible.^[6] Thumb sucking is sometimes retained into adulthood and may be due to simply habit continuation. Using anatomical and neurophysiological data a study has found that sucking the thumb is said to stimulate receptors within the brain which cause the release of mental and physical tension.^[7]

Dental problems and prevention

[edit]



Alveolar prognathism, caused by thumb sucking and tongue thrusting in a 7-year-old girl.

Percentage of children who suck their thumbs (data from two researchers)

Age	Kantorowicz ^[4]	Brückl ^[8]
0–1	92%	66%
1–2	93%	—
2–3	87%	—
3–4	86%	—
4–5	85%	25%
5–6	76%	—
Over 6	—	9%

Most children stop sucking on thumbs, pacifiers or other objects on their own between 2 and 4 years of age. No harm is done to their teeth or jaws until permanent teeth start to erupt. The only time it might cause concern is if it goes on beyond 6 to 8 years of age. At this time, it may affect the shape of the oral cavity or dentition.^[9] During thumbsucking the tongue sits in a lowered position and so no longer balances the forces from the buccal group of musculature. This results in narrowing of the upper arch and a posterior crossbite. Thumbsucking can also cause the maxillary

central incisors to tip labially and the mandibular incisors to tip lingually, resulting in an increased overjet and anterior open bite malocclusion, as the thumb rests on them during the course of sucking. In addition to proclination of the maxillary incisors, mandibular incisors retrusion will also happen. Transverse maxillary deficiency gives rise to posterior crossbite, ultimately leading to a Class II malocclusion.[¹⁰]

Children may experience difficulty in swallowing and speech patterns due to the adverse changes. Aside from the damaging physical aspects of thumb sucking, there are also additional risks, which unfortunately, are present at all ages. These include increased risk of infection from communicable diseases, due to the simple fact that non-sterile thumbs are covered with infectious agents, as well as many social implications. Some children experience social difficulties, as often children are taunted by their peers for engaging in what they can consider to be an “immature” habit. This taunting often results the child being rejected by the group or being subjected to ridicule by their peers, which can cause understandable psychological stress.[¹¹]

Methods to stop sucking habits are divided into 2 categories: Preventive Therapy and Appliance Therapy.[¹⁰]

Examples to prevent their children from sucking their thumbs include the use of bitterants or piquant substances on their child's hands—although this is not a procedure encouraged by the American Dental Association[⁹] or the Association of Pediatric Dentists. Some suggest that positive reinforcements or calendar rewards be given to encourage the child to stop sucking their thumb.

The American Dental Association recommends:

- Praise children for not sucking, instead of scolding them when they do.
- If a child is sucking their thumb when feeling insecure or needing comfort, focus instead on correcting the cause of the anxiety and provide comfort to your child.
- If a child is sucking on their thumb because of boredom, try getting the child's attention with a fun activity.
- Involve older children in the selection of a means to cease thumb sucking.
- The pediatric dentist can offer encouragement to the child and explain what could happen to the child's teeth if he/she does not stop sucking.
- Only if these tips are ineffective, remind the child of the habit by bandaging the thumb or putting a sock/glove on the hand at night.
- Other orthodontics[¹²] for appliances are available.

The British Orthodontic Society recommends the same advice as ADA.[¹³]

A Cochrane review was conducted to review the effectiveness of a variety of clinical interventions for stopping thumb-sucking. The study showed that orthodontic appliances and psychological interventions (positive and negative reinforcement) were successful at preventing thumb sucking in both the short and long term, compared to no treatment.[¹⁴] Psychological interventions such as habit reversal training and decoupling have also proven useful in body focused repetitive behaviors.[¹⁵]

Clinical studies have shown that appliances such as TGuards can be 90% effective in breaking the thumb or finger sucking habit. Rather than use bitterants or piquants, which are not endorsed by the ADA due to their causing of discomfort or pain, TGuards break the habit simply by removing the suction responsible for generating the feelings of comfort and nurture.^[16] Other appliances are available, such as fabric thumb guards, each having their own benefits and features depending on the child's age, willpower and motivation. Fixed intraoral appliances have been known to create problems during eating as children when removing their appliances may have a risk of breaking them. Children with mental illness may have reduced compliance.^[10]

Some studies mention the use of extra-oral habit reminder appliance to treat thumb sucking. An alarm is triggered when the child tries to suck the thumb to stop the child from this habit.^[10]^[17] However, more studies are required to prove the effectiveness of external devices on thumb sucking.

Children's books

[edit]

- In Heinrich Hoffmann's *Struwwelpeter*, the "thumb-sucker" Konrad is punished by having both of his thumbs cut off.
- There are several children's books on the market with the intention to help the child break the habit of thumb sucking. Most of them provide a story the child can relate to and some coping strategies.^[18] Experts recommend to use only books in which the topic of thumb sucking is shown in a positive and respectful way.^[19]

See also

[edit]

- Stereotypic movement disorder
- Prognathism

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[edit]

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Further reading

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- o "Duration of pacifier use, thumb sucking may affect dental arches". *The Journal of the American Dental Association*. **133** (12): 1610–1612. December 2002. doi:

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External links

[edit]

- *"Oral Health Topics: Thumbsucking". American Dental Association. Archived from the original on 2010-06-19.*
- *"Pacifiers & Thumb Sucking". Canadian Dental Association.*

Frequently Asked Questions

Does this technology mean my child will need fewer appointments or x-rays?

Potentially, yes. Because computerized analysis helps create a more predictable treatment plan, fewer adjustments might be needed during treatment. Also, some systems use intraoral scanners instead of traditional molds, which are more comfortable for children. While X-rays are still important for overall assessment, the detailed 3D models from computerized analysis might help reduce the need for additional X-rays during treatment by providing more information upfront.

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