Essential dentistry

Module 1 – oral and dental anatomy and physiology and dental charting

The first module in the *BDIA Certificate: Introduction to Dentistry*, covers some of the basics in dental anatomy. Much of the knowledge that you gain from this section may not be used on a day-to-day basis (in my 15 years in dentistry, a customer has never cornered me to test me on the structure of a tooth), but it is knowledge that underpins everything else. So without learning this it's like building a house without foundations.

The mouth

Technically referred to as the oral cavity, the mouth is part of your digestive system, where you begin to mechanically process the food you eat by chewing. The digestive process also starts in your mouth, with saliva (a watery substance containing some enzymes), that helps to lubricate the mouth and aids the tongue in forming the chewed food into a ball (bolus) that you can swallow.

Soft tissue and bone

The inside of your mouth is covered by a mucous membrane that forms a collar around each tooth, which is called gingiva (gum). Much of the mucosa is supported by bone, across two thirds of the palate, and the maxillary and mandibular jaw bones. It is these jaw bones that hold the teeth in place. The mucosa at the back of the palette, under the tongue, and around the cheeks is not supported by bone, and is therefore flexible.

Teeth

The basic pattern of adult (permanent) dentition is to have 32 teeth. There are frequent exceptions to this '32 teeth' rule (especially missing wisdom teeth), but this is the accepted norm. The teeth themselves are split into groups in each quadrant (quarter of the mouth). From the front, the first two are Incisors, the third is the canine (commonly called your 'eye' tooth); next back are two

Glossary of dental anatomy

Buccal – tooth surface facing the cheek.
Cementum – the outer surface of the tooth root – used as an anchor for the periodontal ligament.
Condyle – a rounded protuberance of bone at the top of the mandible that forms part of the temporal mandibular joint.
Dentine – layer under the enamel that constitutes the bulk of a tooth. Contains nerve endings, so will cause tooth sensitivity if it is exposed.
Distal – the far (distant) side of molars and premolars.
Enamel – outer surface of tooth crown; hardest substance in the body, contains no nerves or blood vessels.
Labial – tooth surface facing the lips.
Lingual/palatal – tooth surface facing into the mouth (lingual in the mandible, palatal in the maxilla).
Mandible – lower jaw.
Mandibular/mental foramen – holes in the mandible though which nerves pass.
Mastication – chewing.
Maxilla – upper jaw.
Mesial – the near side of molars and premolars.
Proximal – the space between neighbouring teeth.
Pulp – the inner layer of a tooth containing blood and nerve vessels.
Saliva – a watery secretion that aids oral cleansing and digestion.
Temporal mandibular joint – the joint that moves when chewing and speaking.

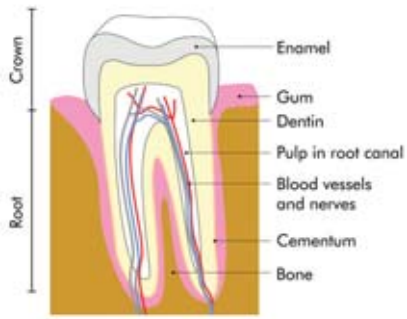
premolars (Americans will call them 'bicuspids'), and the rest are molars, including your 'wisdom' tooth.

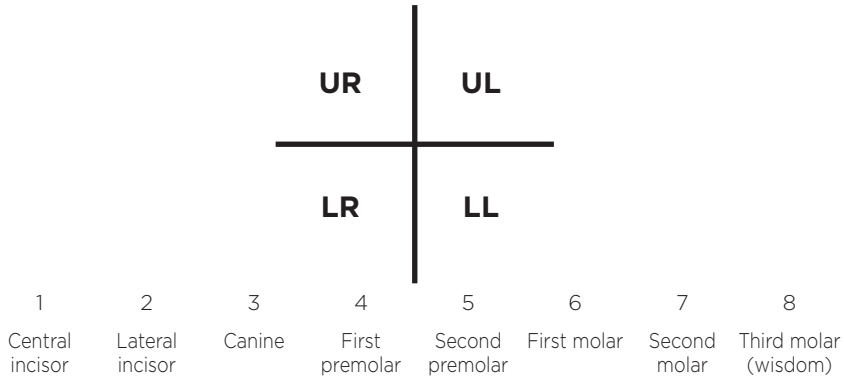
As a child, you had fewer deciduous teeth (your 'baby' teeth); only five in each quadrant. The first three are incisors and canines, but the final two are referred to as molars and not premolars, as they would be in adults.

Tooth shape

Most teeth have a single root; the exceptions being the molars, which have three roots on the maxilla, and two in the mandible.

- Incisors are cutting teeth, and so have a spade-like shape, with an incisal edge.
- Canines are cone-shaped.
- The premolars and molars have flatter 'occlusal' surfaces that butt up to (come into occlusion with) teeth on the opposing jaw, enabling you to grind food. The pointed tips of these teeth are called cusps.





Dental charting systems

To record the state of a patient's mouth, various charting systems are used. The UK commonly uses the Palmer system. This uses a numbering system, labelling each tooth as 1-8 in each quadrant (or a-e in children). The old way of indicating the quadrant with lines to show which quadrant the tooth is in doesn't translate to computers. Nowadays, the quadrant will be noted with the letters U, R and L, from the patient's perspective (for example, upper left is UL, but shown on the right in the diagram). So the central incisor on the upper left side can be noted as UL1; the lower left first molar as LL6.

The other system you will come across in the UK is the FDI system (use often depends on the computer program being used). Here the quadrants are labelled clockwise from 1-4 (starting with quadrant 1 as the upper right), or 5-8 in children, with the teeth numbered 1-8, as before. Here the central incisor on the upper left side is 21, the lower left first molar is 36.

Just to confuse everyone, American dentists use a third system, the 'universal' system, going from 1-32. However, this is universal only in the sense that the American World Series baseball championship is international.

The next step

The next issue of *Dental Insider* will cover oral health and disease. For more details on the *BDIA Certificate: Introduction To Dentistry*, go to www.introductiontodentistry.co.uk

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Essential dentistry: Tooth whitening in the spotlight

Part B: Exploring the detail

Tooth whitening is currently the biggest driver for patients to seek out cosmetic products and treatments in the dental market, but it is also an area that is plagued by illegal practice and legislative battles. But where are we at with tooth whitening today?

Tooth whitening is not a new phenomenon. Indeed, people have been seeking whiter teeth for centuries. It is thought that the Ancient Egyptians, Ancient Romans and Middle Age barbers all had a go with materials ranging from vinegar to nitric acid; sage-salt rubs to urine. Now it is probably the most marketed and most popular treatment in cosmetic dentistry.

Tooth whitening – the basics

Though the terms bleaching and whitening are often used interchangeably, if we are being pedantic about it whitening is different to bleaching. The International Organization for Standardisation (ISO) defines tooth bleaching as 'removal of intrinsic or acquired discolorations of natural teeth through the use of chemicals, sometimes in combination with the application of auxiliary means'[1]. It involves altering the light absorbing or light reflecting nature of the tooth which means that it appears to be whiter. On the other hand whitening means that the tooth becomes whiter but in this case is not defined by a particular process, so this could be achieved by abrasion through brushing or polishing for example as well as through bleaching materials[2].

Tooth whitening is now probably the most marketed and most popular treatment in cosmetic dentistry.

Tooth whitening products generally consist of in-surgery whitening, home whitening kits prescribed by a dental professional (eg nightguards) or over-the-counter materials, such as whitening strips, toothpastes etc.

Current tooth bleaching materials almost exclusively use carbamide peroxide and hydrogen peroxide (H_2O_2) as active ingredients in tooth bleaching regardless of in-surgery or at-home uses.

Legal battles

The legal position relating to tooth whitening in Europe has been confusing – there have been ongoing issues around who is allowed to carry out tooth whitening and the levels of hydrogen peroxide allowed both in 'at-home' products and chairside whitening procedures. Tooth whitening agents were deemed to be covered under the EU Cosmetic Directive rather than the EU Medical Devices

Directive. This technically deemed it a criminal offence to supply products with more than 0.1% H_2O_2. Hence, technically many dentists could have been considered to be 'illegally' supplying whitening products. Though thankfully no dentists were ever prosecuted for this, the confusion was causing a real problem for dentists and patients.

In October 2012 the UK Cosmetic Product (Safety) (Amendent) Regulations 2012 finally clarified the law in relation to the provision of H_2O_2-containing (and H_2O_2-releasing, such as carbamide peroxide) products.

The regulations – in a nutshell

Tooth whitening is the practice of dentistry and should only be done by regulated dental professionals. Anyone who practises dentistry illegally risks being prosecuted by the General Dental Council[3].

Products containing or releasing[4]:

- Over 0.1% H_2O_2 cannot be provided directly to the consumer.
- Up to 6% H_2O_2 can only be sold to dental practitioners.
- This H_2O_2 can only be made available to patients following an examination, with the first episode of treatment being provided by a dentist, or by a hygienist or therapist under supervision of a dentist (ie within the same dental setting) after which they can be provided to the patient to complete the cycle of use.
- Over 0.1% products cannot be used on persons under 18 years of age (unless the use is intended wholly for the purpose of treating or preventing disease. Dentists are advised to contact their defence organisation before proceeding).
- Over 6% H_2O_2 remains illegal to use.

It's worth noting that products containing 10% carbamide peroxide will release approximately 3.6% H_2O_2. Sodium perborate- and chlorine dioxide-based whitening products should not be used due to serious patient safety concerns. Note also that the production of tooth whitening trays does not required registration with the MHRA.

Is 'use' the same as 'supply'?

There remains a question about whether or not the regulations cover the final 'use' (application rather than supply) of the product. The Department of Business, Innovation & Skills (BIS) feels that they do not; implying that the application of any whitening product of any concentration (even above 6% H_2O_2) during in-surgery whitening is fine, meaning that enforcement action by Trading Standards is unlikely[4]. However, this interpretation of the regulations is not widely shared and the BDA, GDC, and many defence organisations advise caution and counsel that the 'use' of a product on a patient does constitute supply and therefore the 6% is applicable[4].

The market and the black market

The whitening market is generally thought to be on the up in the UK. The proliferation of 'celebrity smiles' and reality shows have made whitening one of the most popular cosmetic treatments in the UK. According to research carried out by Mintel in 2014, 30% of people in the UK use whitening toothpaste daily and 14% had used whitening strips and kits[5].

A major problem in the whitening industry continues to be the sale of illegal whitening kits and the provision of treatments by those who are not qualified to carry them out, such as beauticians and high street kiosks. Many dental groups are working with the GDC and Trading Standards to get the message to the public that 'cheaper' alternatives carried out by non-dental professionals are being performed illegally and pose real health risks to patients.

TWIG

The Tooth Whitening Information Group (TWIG) formed in 2012 to promote and ensure safe legal tooth whitening. Their mission is to make tooth whitening safe for the public and facilitate the reporting of illegal tooth whitening. The list of organisations involved includes the BDIA, the BDA, the Oral Health Foundation and many members of the BDIA.

References

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Ruth Doherty, Managing Editor of the *British Dental Journal*, discusses the issues surrounding tooth whitening.