

Smile Makeovers – It's all in the bite!

“The uptake of cosmetic dental procedures has seen an unprecedented rise in recent years. No doubt this has been fuelled by the pictures of many glamorous Hollywood celebrities with smiles to match, appearing in our glossy magazines, plus all the televised cosmetic makeover programmes such as *Extreme Makeover*, and *10 Years Younger*”, notes **Mr Haider Raza**, **Principal Dentist at Thurloe Street Dental** and our *Guest Writer* for this month's Consulting Room™ newsletter.



The smile, along with the eyes, is regarded as the most important feature when making a good first impression. A first impression is made usually within the first 30 seconds of meeting someone, and the old adage holds true that “*you never get a second chance to make a first impression*”. These days having a healthy, beautiful smile is associated with people who are more successful in their lives and careers.

Everybody wants to make a good impression, and to look their best, and now there are an increasing number of ways that cosmetic dentistry can help:

1. Tooth whitening.
2. Smile makeovers using porcelain veneers or other laboratory restorations such as crowns, bridges, implants and dentures.
3. Smile makeover using resin veneers, or bonding.
4. Orthodontic treatment of which there are 3 basic types:
 - a. Fixed metal braces (affectionately known as “train tracks”). The brackets can be ceramic or metal. These are usually visible, unless made to fit on the back of the teeth
 - b. Removable metal braces
 - c. Invisible braces such as Clear Step®, or Invisalign®.

So what can go wrong?

Every cosmetic procedure carries with it, a potential risk or side effect. Without doubt, the most commonly overlooked aspect of dentistry, and in my and many others opinion, the most important overlooked factor is the “**occlusion**”.

What is Occlusion?

Occlusion can be thought of simply as ‘the bite’, and it refers to the way our upper and lower jaws bite and relate together.

We bite with more than just our teeth, in fact our upper jaw relates to the lower jaw through 4 main components:

1. Teeth

There are up to 32 teeth in a normal adult. The precise interconnection of these teeth affects the positioning of the lower jaw at rest and in function.

2. Jaw joints

There are 2 jaw joints located just in front of our ears. These act as specialised hinges, and help in all movements of the lower jaw against the upper.

3. Muscles

There are many sets of muscles in the face responsible for the opening, closing and horizontal positioning of our jaws for comfortable chewing. The muscles in our neck shoulder and back also act as bracing muscles to ensure smooth movements of our jaws.

4. Neuro-muscular system

This is the way that our brain links with the other parts of the bite system through sensors and ligaments, and coordinates the overall jaw movements.

The following table illustrates the advantages, disadvantages and perhaps more importantly the risk to our bite system of various cosmetic dentistry procedures:

Treatment	Advantages	Disadvantages	Risk to Bite System
Porcelain veneers Crowns, bridges implants and dentures	Best aesthetics: 10/10 Colour, shape, contours and minor details can be designed to give the best looking results.	Teeth will need to be shaped and trimmed to receive the restorations.	Medium risk This depends on the number of biting surfaces changed. If many teeth are involved : High risk If biting surfaces are not altered : Low risk
Resin veneers or bonding	Good aesthetics: 7-9/10 Similar to porcelain veneers. These can achieve excellent results, with minimal tooth reduction. Less costs.	Not as good looking as porcelain veneers, and not as long lasting, but can come very close. Will need re-polishing at maintenance visits.	Low risk / No risk Since the biting surfaces are not often changed there is minimal risk
Orthodontic braces Clear Step® / Invisalign®	Reasonably good aesthetics: 5-8/10 No trimming or reduction of teeth.	No colour change. Only changes the arrangement of the teeth, no effect on the contours of the teeth. Small details cannot be designed. May need for extractions.	High risk Since by their nature, braces are designed to move teeth, the risk to the bite system is high.
Whitening	Low costs Predictable Simple	Arrangement of teeth is the same. No change of tooth shape or contours or any details. Restorations will not change colour.	No risk

The risks to the bite system will not be significant if the bite is dealt with correctly from the start, i.e. the risks can be minimised or eliminated with correct diagnosis and treatment.

Different Types of Occlusion

Most dentists are confused about occlusion. Based on figures from The British Society of Occlusal Studies it is estimated that less than 2% of UK dentists have anything more than a very basic understanding of it, this is due to the fact that occlusion is not taught at University, so postgraduate education is a requirement in order to understand it properly, and there are only three institutes worldwide (one in the UK and two in the USA) who actually teach it. So it is no wonder that patients themselves can be more than a little confused.

There are many different ways that occlusion can be described, such as: class I, class II division 1, class II division 2, class III, crossbites, malocclusion, open bites, overbites, etc... The good news is that most of these descriptions have no relevance when it comes to functional occlusion.

For our purposes occlusion can therefore be simplified as:

1. Healthy or normal occlusion (physiological)
2. Disease causing occlusion (pathological)

The main problems of a bad bite are caused through the clenching or grinding together of your teeth. These are termed para-functional habits; the most common of which is called 'bruxism'.

What causes Para-Function?

Bruxism and other para-functional habits are influenced by two factors:

1. Stress
2. Poorly harmonised bite system (i.e. the 4 components of the bite system are not in the correct relation to each other).

If any one of these factors is absent, then you will not be subject to the same levels of grinding or clenching. Also many people have a natural adaptability to both stress and bite imbalances, meaning the process can be stopped by reducing one or both factors sufficiently such that they are within the person's natural adaptability.

Why is Para-function a Problem?

	<u>Chewing</u>	<u>Bruxism</u>
1. Forces	20 - 40 lbs/inch ²	300 lbs/inch ²
2. Time	8 - 12 Minutes	3 - 4 Hours
3. Local Factors	<ul style="list-style-type: none"> • no direct contact • food between teeth • saliva - excellent lubricant 	<ul style="list-style-type: none"> • direct contact • tooth-to-tooth contact • mouth dry - very abrasive
4. Mechanical Factors (Leverage)	low forces no mechanical advantage	high forces the mouth acts like a machine and multiplies the forces in a similar way to how we use a crow bar to produce a much larger force than what we put in

Because of the difference in magnitude of forces, times and the differences in conditions we have a saying:

“A night time's worth of grinding is equivalent to a lifetime's worth of chewing”.

Teeth should loose less than 1mm in height over a lifetime's worth of chewing. I often see people loosing far more tooth substance over only a few years. This is because they have a pathological occlusion.

The fundamental basis of the bite system is health, so that each part of the bite system helps maintain and protect the other parts; e.g., the back teeth protect the front ones by taking the bulk of forces in the chewing cycle; the front teeth protect the back ones by guiding them to stop colliding with each other during the chewing cycle and other movements. When the balance of this system is upset, certain parts can start to deteriorate and become damaged. This deterioration will upset the balance further and contribute to even further deterioration.

I often explain this to patients in terms of a car with low air pressure in one of its tyres. While causing no immediate serious side effects, this will cause more strain on the engine and other components, the car will become less efficient to run, consuming more petrol, and the tyres themselves will be subjected to a little more deterioration increasing the rate of pressure loss. This puts even more strain on the car subjecting it to even greater stresses. If the tyre was to eventually burst from this vicious cycle and you continued to drive on it, then there would be rapid and serious destruction to all other parts of the car.

Often patients will come in saying that their teeth are now getting old and starting to break. This is never the case, as it is usually due to a poorly balanced bite system; this is a vicious cycle which encourages further damage rather than protection.

This picture (see right) shows the effects of para-function. Three teeth have deep fractures running through them. The fractures on two of these teeth were only seen after removing the overlying fillings.

The bite system can also be thought of as a table, with each component being represented by a leg. If the bite system is not in harmony, (legs do not meet the floor at the same time), and the table is loaded (stress), this can cause the table to rock. This rocking exaggerates the clenching or grinding of your teeth.



What Can Happen?

The large forces generated over a prolonged time have to have a net effect, i.e. this force must be dissipated over part of the bite system. Each leg of the table (part of bite system) can be subjected to the forces mentioned previously, and can therefore suffer from one or more of the following conditions:

1. Teeth

- Wearing, chipping and breaking of teeth and restorations
- Shorter teeth. Poor looks
- Darker teeth due to thinned enamel, and reparative changes
- Lost fillings, and or crowns, bridges and implants.
- Can cause the death of a tooth nerve
- Because of the high impact of forces on the teeth, it can cause the bone to thicken over time in the jaws to help brace the teeth.
- Exaggerated gum disease
- Loosened teeth
- Gum recession
- Loss of tooth substance at the gum line (rather like a plastic ruler would eventually start to develop craze lines after repeated bending). ("abfraction lesions")



Shows a patient who has chipped porcelain veneers within 18 months, which they wanted replacing.



Shows a patient where all teeth have heavy wear. They have worn through most of the white fillings and also through the entire enamel layer of all front teeth.



This picture shows wear of the front teeth. You can see how the teeth have splayed out from heavy horizontal grinding forces.

2. Muscles

- Can cause fatigue of muscles
- Can lead to chronic painful headaches
- Neck, shoulder, or back pain
- Pain in the face
- Pain behind the eyes
- Difficulty or pain from chewing
- Limited movement of jaw

3. Jaw Joints

- The ligaments holding the disc of the jaw joint in place can become stretched and deformed
- The disc can then come off the joint, and will no longer provide any protection to it
- The cartilage disc can become perforated, this can be extremely painful as bone will be acting against bone
- The disc can become displaced and replaced by surrounding tissue, this again can be extremely painful
- Tinnitus, earache, vertigo
- Sticking, clicking, locking or even dislocation can occur

4. Neuro-muscular system

- This is nature's way of limiting any pain or suffering to you. This usually causes it to alter the way you bite together (into a more unnatural position) which can then magnify the effects of the imbalances, similar to walking with a stone in your shoe, your body will usually alter its gait to allow you to continue walking without pain in your foot. You may be able to walk several miles like this, but because you are walking in an unnatural way, you may find you have developed an ache in your hip or back. Even though the pain is felt in your back or hip, the actual cause of the pain is still the stone in your shoe.
- Restricted jaw movement

How Do I Tell if I Have Occlusal Disease?

This is best seen by checking the different parts of the bite system with the list above:

- 1. Tooth signs** are fairly easy to spot. Patients can often see these areas, if they have been made aware. Most dentists will be able to spot the effects of wear on the teeth.
- 2. Muscular signs/symptoms.** Any chronic head, neck shoulder or back pain could be linked. Often patients will have had many visits to an osteopath or physiotherapist in the past, and had no idea that their shoulder pain was actually caused by their teeth.
- 3. Joint changes.** Clicks can often be heard, many are sub clinical in that they have not been noticed.

To tell if your jaw joints click:

1. Put your little fingers inside your ear canal and push firmly in, down and forward with your mouth open.
2. Half open and half close your mouth repeatedly. You should feel the back part of your jaw joints moving against your fingers.
3. If you can't feel it try pushing a little further forward and down till you do.
4. Then open wide and close fully a few times, being careful not to close on your front teeth, but on your back teeth.
5. Listen for any joint sounds.
6. If this area is very tender, it could indicate that you have inflamed tissue around the joint.

Clicking joints become more significant if there is ever any pain associated, or if the click is changing in nature or position of opening to cause the click.

4. The neuromuscular system is harder to analyse, though this is used by us to assess the success of occlusal treatment.

Who Should Have Their Bite Analysed and/or Treated?

1. Anyone considering any form of orthodontic treatment
2. Anyone having multiple restorations
 - a. Multiple fillings e.g., changing multiple posterior silver fillings to white
 - b. Smile makeovers affecting more than a few biting surfaces
 - c. Any treatment involving the changing of 3 or more back teeth biting surfaces
3. Anybody with signs or symptoms of occlusal disease

How Can Occlusal Problems be Corrected?

In the vast majority of cases people with occlusal problems can be treated by a process called 'Occlusal Splint Therapy'.

An occlusal splint is a hard plastic device worn over the teeth at night time, or at times when a person may clench or grind their teeth. The shape of the biting surface is specially designed such that when you put your teeth against it, it slowly encourages the jaw joints to achieve their ideal positions and the muscles to relax. It also reduces the amount, intensity and the force of any clenching or grinding that may still occur. The splint will need to be periodically checked and adjusted until the muscles, joints and teeth are all working together in harmony. At this point, no further treatment is necessary.

Some people would like to have the same bite relationship the splint gives them when they take it out. This can be done through:

- Equilibration
- Restorative work
- Orthodontic movement and equilibration
- A combination of the above

Equilibration is the minor precise adjustment to the biting surface of the teeth such that all elements of the bite system can function in their ideal positions. The same results can be achieved through restorative work such as porcelain veneers, crowns, bridges and implants to get the desired shape. Orthodontic treatment (e.g. braces) and

equilibration can also produce the same results. The aim is always the same i.e. to give the teeth the exact relationship that allows all parts of the bite system to function happily together.

Why is Occlusion so Important in Cosmetic Dentistry?

Respecting the bite system or occlusion is vital with any dental treatment, particularly so with cosmetic treatments such as smile makeovers or orthodontics, where the biting surfaces are being altered. Not accounting for the occlusion can:

- Seriously affect the life of the new cosmetic restorations
- Cause nerve death of teeth
- Cause fracture of the teeth
- Affect the cosmetic result through wear
- Affect the jaw joints and cause damage
- Cause increased sensitivity of the teeth
- Cause pain in muscles of the head, neck, shoulder and back



The top picture shows a patient with tooth wear. (You can also see a little decay). Note the shape of the teeth worn matches with the arrangement of the lower teeth.

The bottom picture shows the wear close up. The holes near the gums are called abfraction lesions which also have some acid erosion and a little tooth brush abrasion.



We have restored her teeth with porcelain veneers after correcting her bite problems.

Correct occlusal management can easily double or treble the lifespan of cosmetic dentistry, or even the teeth themselves. When considering the importance of occlusion in relation to cosmetic dentistry, you should ask yourself the question "*How many times do I plan on having this treatment?*". Not only does this increase the lifespan of your teeth and restorations, but it is also the healthiest choice for your muscles and jaw joints.

For more information on cosmetic dentistry procedures available in the UK, please visit our [Cosmetic Dentistry Treatment FAQ](#) pages.



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