Ortho lecture (13)

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**Benefits and Risks of Orthodontic treatment.**

* Lecture outline:

Definition

Benefits

Risks

Conclusion

* **Definition**

**Shaw**; is one of the most important orthodontists in the UK, he did a lot of work on risks vs. benefits and on indices and one of the important things he said is that **“**the advantages of treatment should outweigh the possible damage it may cause**”** so for any orthodontic/dental treatment you should think of risks and benefits, you should ask yourself if the treatment that you are providing is outweighing the risks or not.

* **Benefits**

Proposed benefits:

1. Function
2. Dental health
3. Esthetics
4. Psychological well-being.
5. Function: mastication and speech.

**Mastication**; malocclusion very rarely causes a problem in mastication especially with our modern diet (soft food) where we don’t really need to chew food. A lot of research has been done on aboriginals of Australia (indigenous people of Australia who lived away from civilization) and they found that they have no malocclusion or any cusps on their teeth because of their hard diet that resulted in tooth wear occlusally and interproximally so no crowding and even spacing was observed. So we conclude that diet have an effect on malocclusion but malocclusion very rarely causes a problem in mastication except if the patient has an openbite and can’t bite into a sandwich!!

 In terms of **speech**; the patients usually adapts to malocclusion very easily, the only things that are a bit difficult to adapt to are; **AOB, lip trap, Severe class III, and cross bite.** The problem is that even after treatment we cannot guarantee that the speech will be resolved because the fact that this problem is a habit to the patient even if we positioned the teeth in their right place it doesn’t mean that we changed that habit. So when we provide an orthodontic treatment to a patient with speech problems we never promise that’s it’s going to be resolved.

1. Dental Health:
2. **Improving TMJ problems:** as we know TMJ problems are multifactorial so correcting the malocclusion won’t lead to 100% resolvation of the problem.

So there’s an association between malocclusion & TMJ problems.

***Note:*** you should know the difference between association and cause effect.

Association means that when you look at a group of people with TMJ problems you find that some of them have a crossbite, AOB and clas III however when we removed those malocclusions the TMJ problems did not necessarily go away.

Cause effect means that when you remove the problem the patient is cured.

Conclusion: If a patient has a crossbite, AOB or a classIII treating that will help solve the TMJ problem but will not guarantee 100%.

1. **Impacted teeth:** we talked about how impacted canines cause root resorption to the lateral incisor so if you have an impacted teeth esp. canine treating that will definitely help to improve the overall dental health.
2. **Caries/Periodontal disease:** caries is a multifactorial disease and mainly related to sugar intake. If you have crowded teeth/malocclusion it doesn’t really predispose to caries and the same is for periodontal disease.

Crowded teeth are more difficult to clean however there are many people with crowded teeth yet perfect OH status so it is more related to brushing and cleaning your teeth than to the actual malocclusion, we can’t say that crowding causes caries or periodontal disease.

1. **Trauma:** if you have an **Overjet** more than 9mm and there are some recent studies that says an OJ >6mm the risk of trauma increases especially if the patient has incompetent lips; why? Because the lips usually cautions the trauma the other thing is increased **overbite**(traumatic) where the patients bites into the palate, and the trauma is not only to the palate but also the upper incisors can shear the labial surface of lower incisors and, finally **crossbites**.
* **Why are we concerned with crossbite?**
1. May cause TMJ problem: by dispalcemnt/altering the mandibular movement.
2. Causes attrition; because the patient bites initially edge to edge on the instanding tooth and then they shift.
3. If you keep biting on one side it acts like a functional appliance (in FA we posture the mandible forward to allow for forward growth of mandible) however incase of crossbite we are biting on one side posturing the mandible sideways so it may cause the mandible to grow on one side resulting in facial asymmetry.
4. In Mixed dentition if patient is displacing to one side either to the right, left or forward the teeth will erupt in the new position for example forward displacement will cause a true classIII rather than a pseudo class III due to teeth erupting forward.
5. Esthetics :> 90% of patients seek orthodontic treatment for esthetic reasons.
6. The other thing is psychological well being:

In the UK orthodontic treatment was included in the insurance NHS, and patients did not pay a thing however the problem was that patient only seek Ortho treatment for esthetic reasons so they removed it from NHS; many researches were done in orthodontics to make sure there are other needs than esthetics for ortho treatment to include it back in NHS. And what happened is that they related the psychological well-being to malocclusion.

* Teasing: professor Shaw found that malocclusion is the 4th most common feature that kids were teasing each other
* Bullying: malocclusion was actually the 1st reason for kids to bully each other in Jordan (a study that was done by dr.Zaid bitar).

Note: sometimes teasing & bullying occur as a result of having braces on, but this is not the case nowadays.

* Self esteem: it’s a bit tricky, patients who have malocclusion &low self esteem will perceive the problem bigger than the actual size of the problem while those who have malocclusion and high self esteem will not see the malocclusion as a big problem. However, we don’t have studies that show that malocclusion causes low self esteem.
* This is the most important point that let the NHS to place back ortho in their services better Quality of Life: O’Brien says that the QOF is improved. However no randomized clinical trials were done so we need more of those control studies. However the doctor does believe that the QOF is improved by putting braces on.
* **Risks**

**Intraoral risks:**

1. **Crown damage:**

Enamel trauma; when we put braces on and they are interfering with occlusion they will cause teeth wear esp. if they’re made of ceramics and another thing that causes enamel trauma is debonding, if you did not use the right bur or the right techniques you might scratch the surface.

Decalcification(WSL)

1. **Root damage:**

Pulp damage; each time you visit the orthodontits the first 3 days after the visit the patient will experience pain due to tightening the wires**(transient pulpitis)**

Soft tissue damage; usually just ulcers nothing really serious and it can be dealt with using wax as a barrier on the brackets/hooks/wires.

Root resorption

**White spot lesions(WSL)**

* 50% of all patients will have at least one WSL at the end of the treatment.
* They looked at caries risk and they found that the overall incidence of caries didn’t increase between people who have braces and those who don’t have braces however caries risk moved from posterior teeth to anterior teeth and from interproximal to smooth surface?
* Most affected are upper canines and lateral incisors, lower canines and premolars.

WSL occur just like caries you need sugar, substrate, and lack of OH …

***Prevention of WSL:***

1. Proper patient selection (the most important factor) if you don’t put braces on a patient with perfect OH you are subjective to multiple WSL. One of the issues is that some patients only improve their OH to get the braces but after they’re on his/her OH deteriorates so it’s tricky.
2. Patients’ education.
3. Topical fluoride MW, varnish, bonding agent( some research suggest to bond the brackets with GI however the bond would be very weak, bands are definitely cemented using GI cement), elastomeric modules( some research suggested the use of some modules that release fluoride, this is of increased advantage because it doesn’t need patient compliance)
4. Tooth mousse(MI paste CPP-ACP)
5. Reduce excess composite around the bracket to reduce areas of bacterial stagnation.

***Treatment:***

1. Small lesions will resolve spontaneously by remineralization from calcium and phosphate found in saliva.
2. LOW concentration of topical fluoride: Why low? What happens is that WSL is not just a surface lesion but also its inside the enamel so if you use a high conc. fluoride the outer surface will get calcified/ hard without the calcification of the subsurface so low conc. will cause calcification from the inside to out.
3. Tooth mousse.
4. Tooth whitening however teeth must become very white to match the calcification.
5. Acid/pumice microabrasion
6. If cavitated; restorative intervention

***Note:*** you can always have the option of discontinuing the treatment if OH was very bad,however it’s hard to stop the treatment here in our society but what the doctor does is he removes the wires making it easier to clean, sends the patient back home and reviews him after few months to asses OH.

**Root resorption**

* It only happens due to iatrogenic dentistry
* Expected root resorption is 2mm in maxilla and 1 mm in mandible because we are moving tooth through bone so there will be bone deposition on one side and bone resorption on another side this turnover causes some root resorption.
* It happens in incisors> canines. Worst is U2>U1>U3>L3>L1>L2.
* Rarely compromises the longevity of the teeth.

***Risk factors:***

1. Blunt/pipette/single rooted teeth.
2. History of trauma to a tooth and the root was resorbed as a result of trauma then the chances of resorption due to ortho treatment are increased. **However** if trauma happened and there was no resorption then this won’t increase the risk!
3. Treatment mechanics:

-Fixed > removable appliance

-Rectangular arch wires will cause some root resorption because it causes torquing movement vs. round wires causes tipping movement.

-The distance that the tooth will move, as distance increases the more the resorption.

- High forces

-Intrusion (some studies say that intrusive forces increases the risk of resorption by 4folds)

All of these are related to inexperienced dentist

1. Treating an impacted canine might cause resorption to the lateral incisor.
2. Duration of treatment ( as it increases more generalized resorption)

***Prevention:***

1. Good history and radiographs. History to know if trauma has occurred and radiographs to identify the shape of the roots that are at high risk
2. Apply Light forces.
3. Shorter duration of treatment time. How can we provide shorter treatment? By good planning!

**Extraoral risks:**

1. **TMJ**
2. **Soft tissue damage(Head gear & allergy)**

**Headgear**

Usually the inner bow of the headgear is of the same distance as with interpupillary distance and if somebody pulled it out it may cause injury to the eyes so a lot of safety mechanisms where incorporated like safety release modules. And those safety mechanisms where introduced after a well publicized case of eye trauma that lead to blindness.

**Allergy**

 Allergy to nickel and latex have been reported.

**Bacterial endocarditis(systemic risks):**

Patients with prosthetic valves are at high risk since some of the appliances do manipulation to the gingiva and also trauma can be caused by some part of the appliance that will introduce the bacteria to the blood stream.

* **Conclusion**
* Not every patient that enters the clinic needs orthodontic treatment.
* Risks and benefits need to be analyzed.
* When the case is minor you sit and discuss the outcome of treatment with your patient including WSL and emphasize on meticulous OH, the doctor does not prefer to discuss root resorption with patients (in the western world they understand however here in Jordan people didn’t understand but if there is a particular root with high risk o f resorprion then we should discuss it) and always try to get a written consent from patient.
* Those patients with severe malocclusion/ functional problems are most likely to gain from treatment.
* Those patients with mild occlusion have the most to lose.