Cons Lecture #12

10/12/2014

The dilemma is the literature represents a wide range of results which are both positive and negative. We have actually to look at all cases to optimize the procedure and treatment outcomes. We have adopted all new technologies to reach the best outcome.

The most important prognostic factor in treatment is Patient Satisfaction. The clinical question remains; does the patient want to save the tooth?! So we have to respect his preference.

Helping patients to keep their teeth is the primary goal of dentistry in general. Dentists and patients usually face the challenges of selecting the treatment with the most beneficial long-term treatment between saving a compromise tooth with endodontics treatment and restoration, or by extraction and implant. We have to be honest with the patient and he has to know what happens behind the treatment given.

Dentistry exists in the market. A tendency exists a simplified approach of extraction and implant due to commercialization, market role, ….etc.

Although there is no lifetime guaranteed for either a natural tooth or implant but the fact is that a missing tooth is irreversibely gone. Tooth should be removed after worthwhile consideration. If we take a look on survival rates of endodontics and implants, you can see that both have good evidence and good value, but the choice between implants and endodontics therapy cannot be exclusively based on outcomes because both are enjoying good therapy outcomes.

Both (endodontics and implants) differ in the biological process, diagnostic modalities, failure patterns and patient's preferences.

Compared to artificial prosthesis (metal), the vital natural human tissues are with sophisticated finitude communication and reaction (cell to cell communication).

Endodontics does making progress but still we have a performance gap; we have a lack of evidence and knowledge to validate what we are doing clinically, we have many unanswered questions.

Treatment outcome for example reflects the complex nature of endodontic science and practice. Neither medical nor dental practices have optimal evidence level available for all situations. Criteria of positive outcomes are changing over years; they are lacking a consensus among dentists and endodontists because outcomes are dependable on multiple unpredictable factors that might complicate the results or might compensate to afford the treatment steps.

Generally outcomes in dental therapy are discussed as; Success, survival intervention, survival of out-intervention, or failure.

If we go to Oxford Dictionary; success means the accomplishment of an aim or purpose. Success in endodontics has been used to characterize the treatment outcomes after RCT. The most popular terms used are success and failure.

In response to implant-retain-prosthesis, the American association of endodontics has also a definition of the success that includes the tooth survival or retention under the pressure of commercialization. So nowadays we are using the terms tooth survival or retention instead of success.

Since there is number of studies have been published for the survival rate following RCT, it seems that there is high survival rate of teeth after RCT; 97% of treated teeth remains functional for 8-years follow-up period.

2004 Friedman suggested a new categorization of treatment outcomes; he used the terms Healing and Healed.

The purpose of RCT is defined as prevention and elimination of apical periodontitis, this is the ultimate goal of endodontic treatment. According to this, success means prevention and elimination of periapical radiolucenecy and symptoms. While failure means development or persistence of apical periodontitis and/or symptoms, according to the definitions of most endodontists in Oxford.

Another fact is that it is very unlikely that with all techniques used in cleaning, shaping and obturation we will obtain bacteria-free canals; it's impossible. Always we leave bacteria behind in obturation. All what we can hope for is reduction in the number of microorganisms in the main canal. So the aim of RCT according to these new limitations should be re-stated as minimization of RCT infection and the severity of apical periodontitis.

In 2011 a new classification was suggested by Wasselink and Shemesh; in comparison to success and failure, they used the terms affected and unaffected. Affected means absence of symptoms and complete or partial resolution of pre-operatively existing periapical radiolucency 1 year following treatment, this category includes healing and healed and it does not require any prevention or further treatment. While unaffected means development of enlargement radiolucency and/or persistence of symptoms 1 year following treatment, this category require intervention and retreatment.

There is a category called Uncertain which includes asymptomatic teeth, lesion prior treatment and following treatment but doesn't increase in size but the tooth is asymptomatic, here we call it uncertain. In these cases we should monitor further 1 or more years following treatment, in the past we used to monitor 4 years to judge success or failure.

A proportion of periapical lesion has healed after 6 months, while the majority has healed within a year. With the proportion of lesion takes much longer, and this is interesting in terms of healing dynamics because when we talk about bone healing, we talked about healing of fractures and sockets who certainly don't take this long, so why does that happen? Why periapical lesions take so long to heal? Is there any wrong with endodontics science? The vital pulp tissue, unless this tissue is infected, doesn't contribute to the breakdown of attachment.

Closed faces like Bees are intended to be sterile, they have no microorganisms in them. What happen is that bees species would not intend to be cleaned by us or by complex neural, cellular and vascular systems to keep our spaces sterile.

The apical third of the pulp, because it's dense, acts as natural temporary barrier slowing the spread of inflammation as infection toward periapical apex. But what happens by this natural temporary barrier? All these amazing physiology and defense mechanisms failed to keep our pulp spaces sterile and the result is a local potential systemic risk.

If we eliminate the cause of human disease, the disease will go. If we eliminate the cause of endodontic disease, the root canal or even if we eliminate the tooth itself, the lesion should be healed.

Dr Shepherd did conventional RCT for 100 diseased teeth; all the teeth contained periapical lesions varing in size between 8 and 35 mm using his one vertical palpaction technique (technique of shepherd). Upon 6 months 56% of teeth have completely healed and in 2 years 99% have healed completely. So 1 tooth still has lesion after 2 years; maybe the 2nd or 3rd canal is hidden behind the palatal canal, they did apicectomy with retrograde filling for it, and guess what the result was? It healed.

The result of this study stored at the heart of our practice and professional; this means when we fail with endodontics we fail to deal with root canal system.

While treatment and outcome should be in balance, the fact is that in endodontic treatment they are not in balance that we expect.

The capacity of 100% healing of endodontic disease, what we obtain is 100 – X ; which is the ABC formula for success during endodontic treatment. If we follow the ABC formula and the failure occurs; we have inadequacy of our understanding of the reasons of failure, although all are regarded that it's a microbiological part. The rationalization is that there was a break in adherence in some way or another to ABC formula resulted in this failure. We all have our X; when we are in our game X represents a very long list with many factors that usually can cause potential failure of our treatment.

The main issue in treatment is to maintain the tooth in function. Logically we have to do all things that make our procedure more predictable and easier to avoid all things that can predictably create problems.

There are changes almost every year and you can choose the material that you have the best skill to use.

Still we don't have the magic instruments to deal with and this is a fact. Stainless steel is a stiff instrument (which we use in our clinics) harder than dentine to work against rigid and curved canal walls. While NiTi is a metal softer than dentine. Old instruments and techniques cause apical problems because of increase the incidence of pathogenic problems in the apical third (curved), but with these instruments we can maintain the original shape and curve of the canal up to master apical file of 25, but above size 25 there is increasing of the incidence of transportation because as the instrument increases in the size it loses flexibility.

S/S inside the canal produces force which concentrates at the tip, pushing the dentine chips ahead of the file creating apical debris clotting blocking the canal and shortening the working length. With the size 35 file, the incidence of pathologies is 58 – 81 %.

When a straight file comes into a curved tooth, the ledge is created and this is a challenge and you have to start removing the ledge to get a better prognosis. So gently and precisely insert and slide the file to avoid creating the ledge because what causes perforation is a straight file in curved root if we use large instrument size.

So we have to slide the precurved files carefully to reach the end of the canal, and we have to spend enough time and flush irrigates to get close to best results.

There many factors that cause failure (the dr didn't mention them), but the main cause is apical perforation (bacterial infection). Long-term therapy resistant for apical lesion is associated with residual bacteria in the apical canal.

Apical surgery isolate but not eliminate bacteria, unless it's probably cleaned, shaped and obturate the root canal system.

Case: trauma caused fracture in the lower central area, there is something in the extraoral discharging sinus in the chin area, each time the surgeons excise the fistula it re-appeared and processed. The patient's chief complaint was pus discharge when he eats and he didn't attend for RCT. What they did is exclusion of non-setting CaOH paste from the sinus in the chin area or debridement and injecting the paste into the canal, on the recall visit discharge ceased and the sinus healed leaving a scar from the previous repeated area surgeries from the dental surgeons. This was the result after nonsurgical root canal treatment as you can see here evident revision of the lesion in the root. A decision making is related to the specialization.

When the instrument is working against curve canals internal forces develop inside the instrument and turn to its original shape. And curve canals require curve instrumentation. It is very important to deal with curve canals from the first insertion, so you have to be very careful. In some cases (tough cases) as c shape, treatment is in battle of patience. When you are in the middle of the canal don't stop, when you inter the curve try to open it all the way when this is possible and have a look at the shape of the instrument when you go out of the canal to give a clue about the internal anatomy of the curve. If the canal is faint it will usually open to the end. Most critical error in getting access is making it in the wrong place and most common error in getting access is making it too small. It should be slightly divergent to ease the procedures. Once you inter the root stop any further cutting in an apical direction and start cutting gradually.

Patient with limited mouth opening we can remove more to get better accessibility to the canals in these patients. Some conditions require larger access operation such as coverage restoration. Don't go blindly working in a black hole fishing and searching for the canals, how you can do it properly if you cannot see it. Sometimes you cannot only go to text books to find information, you have to see it in order to do it (like retreatment, and root restoration) always assume that roots contain 2 canals. Working length is an attempt to close the physiologic constriction; to close the root canal system to the physiologic restriction. In the management of the effected canals it should not be shorter than the length of bacteria (also 1 mm pass this will mean failure because it will increase the chance of treatment failure by 14%).

Length is not just a length; it is 3 dimensional and dynamic because it is going to change with time.

Apical foramen which is the actual constriction of the canal, cannot be determined clinically or radiographically. Position of apical foramen varies widely as it could be anywhere inside the root canal within the root canal system. Working length and canal measurement are now reflected by the use of apex locaters. The reliability of this system is upon a 100% accurate ±1m , and 90% accuracy of working length ±0.5 m which is the strictest distance from the actual apical constriction, while technique sensitive radiographs are only 50% accurate even when the image is excellent . 21% of endodontists where found not to agree with themselves when reading the x Ray for the second time.

We don't want to be vertically long or short, we want to be relevant to the root canal. As you can see the final preparation should reflect the 5 mechanical rules for planning and shaping. Failure means failure to adhere to the 5 mechanical objectives. All these situations should be related to the presence or absence of apical lesion which will change the pattern of healing in these situations. The evaluation time of the treatment; there are no definitive and acceptable criteria in the evaluation. Unfortunately despite all the research we still rely on 3 dimensional object to validate whether we do our job or not and we have to check the length.

Examination steps; x-rays from different angles, check vitality of adjacent teeth and check for coexistence of periodontic lesion.

Signs and symptoms of failure might reflect split root or incomplete obturation not showing in the radiograph.

**Sorry for any mistake**

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