Clinical Outcomes and Bacterial Reduction of Single- Versus Two-Visit Endodontic Treatment Using Single File and Multiple Files Instrumentation Techniques

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Dedication

To my Caring Father…

To my Lovely Mother…

To my Adorable Wife…

To my Amazing Daughter…

List of Contents

List of Figures

List of Tables

The main goal of endodontic treatment is diagnosis treatment and prevention of pulp and periapical diseases. The success of endodontic treatment of pulp and periapical diseases is to restore long standing normal functioning dentition, with no signs or symptoms. Several factors affect endodontic outcomes, not only the clinical success and failure but also patients have their own set of outcomes such as fees, time, pain free and comfort. On the other hand, several factors affect clinical outcomes of endodontic treatment, such as age groups, pulp and periapical status, instrumentation techniques, quality of obturation. That is why understanding treatment modalities and clinical outcomes by the dental professionals rises the standard care in the endodontic area.

During endodontic treatment, patients may experience pain in varying degrees and duration. They might as well suffer from endodontic flare-ups where severe pain and/or swelling after root canal treatment and requiring an emergency interappointment. Despite postoperative pain and flare-ups are poorly correlated to long-term success rate of the root canal treatment, they are displeasing occasions for both patient and clinician. That is why occurrence and control of pain is drove the interest of endodontists. Several factors might contribute to postoperative pain and endodontic flare-ups such as preoperative

pain, pulp and periapical status, tooth location, age group, number of appointments and the use of intracanal medication.

Most of endodontic problems are microbial in origin, as it has been strongly established that apical peridontitis is caused by bacteria within the root canal. Hence the main goal of endodontic treatment is prevention and elimination of intracanal bacteria by a combination of proper mechanical instrumentation and irrigation with a tissue dissolvent antibacterial solution of the root canal systems allowing proper disinfection to promote healing of the periapical tissues.

Single visit root canal treatment versus multiple visit treatment might be approved for vital uninfected pulpal condition, while still under debate for necrotic infected condition especially with apical peridontitis. So many factors affect the treatment procedure concerning the number of visit such as pulp and periapical conditions, prevalence of intracanal bacteria, post-operative pain and flare up and patient preference. Heterogeneity of studies and lack of evidence concerning number of visits (single versus multiple) for treatment for non-vital infected pulp failed to indicate the optimum clinical choice. Single file reciprocating nickel titanium instruments became one of the major interests of endodontists, researches and manufacturing companies in the last years. WaveOne file is one of these systems that is designed to work in a reverse balanced

force action using pre-programmed motor in a back and forth “reciprocal” motion. The use of a single file for preparation of root canal might be more time saving and cost effective also the manufacturer claimed that the special designed file with this motion improved the strength and the resistance to cyclic fatigue of this instrument. But it still unclear if the use of this file improves root canal treatment in terms of clinical outcomes, reducing postoperative pain and reduction of intracanal bacteria when compared to multi-file instrumentation systems.

Measurement of outcome of the intervention, in clinical trials, may constitute any consistently anticipated and measurable consequence of the treatment. The final prepared shape of the root canal system, bacterial reduction, and the quality of the root filling may all be regarded as outcome measures by this definition. But the ultimate clinical measure of a treatment outcome is assessing the prevention and resolution of disease.

As any other medical discipline, assessment of the outcomes of endodontic treatment might be carried out in four dimensions[1].The first dimension is physical/physiologic and related to presence or absence of pulpal and periapical disease, pain, and the tooth maintained in function. The second dimension assesses longevity or tooth survival. The third dimension relates to economics and assesses direct and indirect costs. Finally, the fourth dimension examines psychologic aspects involving perceptions of oral health related quality of life and aesthetics.

Apart from the importanceof developing a solid foundation of evidence-based practice, it is important to evaluate treatment outcomes for several reasons. First, treatment procedures must be effective. Otherwise, there is no reason to recommend them to patients as a treatment option also the

patient must be properly informed to the risks, benefits, and potential outcomes of the offered treatment. The availability of pooled outcome data and consensus guidelines offers both patients and endodontists reassurance and confidence in the validity and predictability of the offered procedure.

In contrast to other areas of endodontics, the number of studies and extent of investigation of non-surgical root canal treatment is more comprehensive, yielding a much greater insight even though the quality and scope of the research does not always reach the highest levels. Amongst the studies reviewed, there were substantial variations in study characteristics such as sample selection, definition of successful cases, duration after treatment, type and strategy of data collection as well as data analyses. A landmark study on endodontic outcome assessment by Strindberg laid the foundation for conduct of future endodontic outcome studies[2]. This study established criteria for evaluation of endodontic outcome, commonly referred to as Strindberg criteria, related the outcome of endodontic treatment to the preoperative periapical diagnosis. It also defined the duration and frequency of follow-up: every 6 months for the first 2 years and yearly thereafter up to a minimum of 4 years postoperatively.

Over the years, the terms, success and failure, came under close scrutiny due to discrepancies in clinical, histologic, and

radiographic observations. New modifiers and criteria were added, such as *stringent and lenient*[3], and *strict and loose*[4,5]. This became confusing for practicing dentists who had to decipher the terminology and apply it to clinical assessment of endodontic outcome. Escalating the debate and controversy on endodontic treatment outcomes was the misleading comparison of endodontic treatment outcomes to the success rate of a single-tooth implant[6,7]. The term, success, was based on entirely different criteria for the two treatment modalities. A series of articles, now known as the Toronto Study[8–10], introduced yet another set of terms deemed more appropriate to assess endodontic treatment results. The assessment of outcome was based on the Periapical Index (PAI) and categorized outcomes as "healed" when the PAI score is less than 3 or "disease" for PAI scores greater than or equal to 3. A novel category, "functional," was introduced for all teeth that were asymptomatic, regardless of PAI score. Subsequently, it was proposed that that endodontic treatment outcome should be expressed in terms of the healing of disease, and new terms, healed, healing, disease, and functional retention, were proposed[7].

So, we can say that root canal treatment outcome can be measured by numerous short and long-term criteria. The correlation of postoperative pain with different variables,