# SUCCESS RATE OF ROOT CANAL TREATMENT

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# ABSTRACT

Much effort has been invested in attempts to answer this question. The reported mean success rate range from 31% to 96% based on strict criteria or from 60% to 100% based on loose criteria, with substantial heterogeneity in the estimates of pooled success rates. This variability of the reported data; demands for the analysis of the reasons responsible for such variability. Major reasons are the design of the studies, the endodontic techniques applied in them, the qualifications of the operators performing treatment and difficulty of cases, observation period and Criteria used to evaluate treatment results. The serious limitations of longitudinal clinical studies restrict the correct interpretation of root canal treatment outcomes.

#### **KEYWORDS** - *Root canal treatment, Success rate, Variability factors.*

#### INTRODUCTION

Studies have presented data indicating a success rate of Endodontic therapy ranging from 53% to 95%<sup>1-3.</sup> The higher figure suggests that almost every endodontic treatment succeeds, whereas the lower indicates that almost every second case fails. The reported mean success rates ranged from 31% to 96% based on strict criteria or from 60% to 100% based on loose criteria, with substantial heterogeneity in the estimates of pooled success rates<sup>4</sup>. This variability of the reported data demands for the analysis of the reasons responsible for such variability.

Major reasons responsible for variability are related to

- i. Design of the studies.
- ii. The endodontic techniques applied in them.
- iii. The qualifications of the operators performing treatment and difficulty of cases.iv. Observation period.
- v. Criteria used to evaluate treatment results.

### I) Design of the studies:

# a) Different methods of evaluation of treatment results:

Most investigators used radiographic and clinical findings for evaluating treatment results. Several used only radiographic findings, whereas others used histological examinations. However

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there are problems associated with each one of the evaluation methods as well as with correlation between them.

Clinical evaluation often relies on subjective findings such as report of pain or discomfort upon percussion that is subject to individual variations. Resorting to only radiographic evaluation may allow a pathosis, which is expressed clinically without radiographic manifestations, to be overlooked. The use of histological examination as a routine evaluation is impractical. Moreover its value is limited because of the need for interpretation of the findings. Unfortunately, there is only limited correlation between various evaluation methods with regard to endodontic treatment result.

#### b) Recall Rate:

It was observed that the recall rate in most studies varied from 11% to 74% whereas some reports did not mention the recall rate at all. It was suggested that the success / failure ratio in the unexamined portion of the population could not be assumed to be the same as that found in examined portion. So in order to be considered valid, studies of failure in any clinical discipline must contain adequate number of recall and that the very least inclusion of the original sample should be mandatory.

# c) The presence of periapical pathosis

It has been pointed out that in previous studies teeth with periapical radiolucency (a potentially 'failing' factor) constituted between 18% and 64% of the material. Such a significant difference may explain why the results of those studies also differ significantly.

# **II)** Treatment techniques

The effect of endodontic treatment techniques on the success rate has been clearly demonstrated in different studies. It was found in one of the studies that when Ingle's standardized technique was introduced to a Norwegian dental school, a 10% higher success rate was reached than the previous long term studies at the same school. Similar findings were also reported in the Washington study.

The most important therapeutic factors are the apical extension of the filling material and the obturation quality. These factors were examined in several studies producing unanimous agreement that they do influence treatment result. Both the factors are directly related to treatment technique.

#### II) Qualification of operators and difficulty of cases:

Washington study indicated that there was no statistically significant difference in success rate between cases treated by students and by dentist in practice. The explanation to this finding was that most of the university cases failed because of error in treatment whereas majority of practice cases failed because of error in case selection.

Also the easy cases, whenever possible, find their way to undergraduate clinics, where as experienced dentist treat more complex cases, which also have a more doubtful prognosis. In other words, the difficulty of treated cases may also contribute to the wide variation in the reported treatment results.

### IV) Observation period:

Some of the studies categorized treatment results not only as success or failure, but also as doubtful or uncertain. As the number of successful cases increased with time, there was decrease in the number of doubtful cases. This may be because of slow process of healing. The period of postoperative observation advocated by various investigators varies between 6 months and 4 years.

The first international conference on Endodontics (1953) dealt with this dilemma and

recommended a 1 to 2 year period of observation <sup>5</sup>. In third international conference on Endodontics (1963), it was suggested that healing may still occur in cases regarded as failures even after 4 years if the observation period is prolonged <sup>6</sup>.

## V) criteria for definition of treatment resutls

# a) The use of different criteria in studies:

There is no agreement on the definition of success or failure of endodontic treatment in as much as there is no agreement on criteria. So it is concluded that as long as investigators use different criteria for evaluating success and failure, this fact alone will contribute significantly to the wide variation in reported treatment results.

Seltzer<sup>9</sup> suggested the following criteria for successful endodontic therapy, admitting that they are not all inclusive or conclusive.

- 1. Absence of pain or swelling
- 2. 3. Disappearance of fistula.
- No loss of function
- No evidence of tissue destruction 4
- Radiographic evidence of an eliminated or 5. arrested area of rarefaction after 6 to 24 months.

# b) Fallibilities of Radiographic Interpretation:

Since radiographic evaluation plays a basic role in the assessment of treatment results, any fallibility associated with the interpretation of radiographs will directly distort the reported rates of success and failure.

The following factors influencing fallibility should be considered.

- 1. Change in angulations
- Quality of film 2.
- 3. Lack of radiographic changes
- Proximity to anatomical landmarks 4.
- 5. Radiolucency of periapical scar tissue
- Personal bias and disagreement between 6. different interpreters.

Traditionally, periapical radiography has been used to assess the outcome of root canal treatment with the absence of a periapical radiolucency being considered a confirmation of a healthy periapex. However, a high percentage of cases confirmed as healthy by radiographs revealed apical periodontitis on cone beam computed tomography (CBCT) and by histology. In teeth, where reduced size of the existing radiolucency was diagnosed by radiographs and considered to represent periapical healing, enlargement of the lesion was frequently confirmed by CBCT.

In clinical studies, two additional factors may have further contributed to the overestimation of successful outcomes after root canal treatment:

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# Review articles

(i) extractions and re-treatments were rarely recorded as failures; and (ii) the recall rate was often lower than 50%. The periapical index (PAI), frequently used for determination of success, was based on radiographic and histological findings in the periapical region of maxillary incisors. The validity of using PAI for all tooth positions might be questionable, as the thickness of the cortical bone and the position of the root tip in relation with the cortex vary with tooth position. In conclusion, the serious limitations of longitudinal clinical studies restrict the correct interpretation of root canal treatment outcomes  $1^2$ .

#### **References:**

- 1. 1. Jokinen, MA et al: Clinical and radiographic study of pulpectomy and root canal therapy Scand J. Dent Res. 86: 366, 1978.
- 2. Morse DR et al: A radiographic evaluation of the periapical status of teeth treated by the gutta percha eucapercha endodontic method: one year follow up study of 458 root canals, oral surg. 55: 607, 1983.
- Pekruhn RB: The incidence of failure following single visit endodontic therapy. J.Endod.12: 68, 1986.
- Ng YL, Mann V, Rahbaran, Lewsey, Gulabivala K: Outcome of primary root canal treatment: systematic review of the literature - part 1. Effects of study characteristics on probability of success. Int Endod J 2007 Dec; 40(12):921-39.
- Grossman LI, editor: Transactions, First international conference on endodontics, Philadelphia, 1953, University of Pennsylvania.
- Frostell G: Clinical significance of the root canal culture. In Grossman LI, editor: Transactions, Third international conference on Endodontics, Philadelphia; 1963, University of Pennsylvania.
- Harty FJ, Parkins BJ and Wengraf AM: Success rate in root canal therapy: A retrospective study of conventional cases, B.D.J. 70: 65, 1970.
- Kerekes K and Tronstand L: Long term results of endodontic treatment performed with standardized techniques J Endod 5: 83, 1979.
- Bender, IB, Seltzer S and Soltanoff W: Endodontic success: a reappraisal of criteria. I and II, Oral Surg. 22: 780, 1966.
- 10.Ingle, J.I: Endodontics, Ed 3, Philadelphia, 1985 Lea and Febiger.
- 11.Stephen Cohen & Richard Burns: Pathways of the Pulp, 5<sup>th</sup> Ed. California, 1991.Mosby Year Book.
- 12.Wu MK, Shemesh H, Wesselink PR: Limitations of previously published systematic reviews evaluating the outcome of endodontic treatment. Int Endod J. 2009 Aug; 42(8):656-66.

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