

## The single case study: Combined endoperiodontal lesion and the effects on insulin resistance

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### Summary

Schulze A, Busse M. The single case study: Effects of root abscess treatment on insulin therapy in a type 2 diabetic patient. *Clinical Sports Medicine International (CSMI)* 2008, 1(8): 5-8.

**Methods:** An acute apical abscess (tooth 16) was treated by dental trepanation and buccal incision. The root canals were purified and irrigated with sodium hypochlorite solution. Starting on the seventh day after trepanation, the patient was treated systemically with clindamycin (3x300mg). This therapy was maintained for only 7.5 days due to lack of compliance by the patient.

Since the patient was in general diabetes therapy, the daily insulin dose and blood glucose values were documented. Mean values were calculated from

measurements taken 21 days before and after the dental therapy.

**Results:** Short and long term insulin units were reduced one day after root therapy had occurred. Markedly reduced insulin medication could also be maintained during the 21 days following the root canal therapy. The morning fasting glucose values and the late evening values were also slightly decreased in these 21 days.

**Discussion:** From the anamnesis and the clinical signs it was obvious that the acute inflammation was due to a long lasting chronic apical periodontitis. The treatment of this inflammation apparently improved insulin sensitivity.

**Key words:** diabetes, apical periodontitis, dental abscess, root therapy, insulin

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### Introduction

A number of studies have stated that a local periodontal process may reduce insulin sensitivity and thus increase the needed dose of insulin (4,5). Studies have also shown that periodontal therapy may decrease the need for insulin and further improve blood

glucose values (4,5,6). It has been hypothesized that the local inflammatory process may increase systemic immune responses such as an increase in IL-6 or C-reactive protein (CRP).

### Methods

The patient was insulin dependent for one year and had received thorough instructions on how to manage the insulin therapy. Nevertheless he was in compliant with the given general lifestyle recommendations, medications and restriction of calories, particularly in the restriction of sugar and sweets.

The tooth 16 had no caries but was devital due to deep periodontal tissue destruction, which had caused retrograde infection and necrosis of the pulp. According to the anamnesis, this had occurred at least half a year or more prior to the diagnosis. After 21 days of thoroughly documented insulin doses as well as early fasting and late night glucose values, the root canal therapy was initiated. On day "0" an x-ray was taken and a trepanation of the tooth was performed. The root

canals were purified and irrigated with sodium hypochlorite solution immediately and three times in the following week. From the seventh day after trepanation the patient was additionally treated with clindamycin (3x300mg) systemically. Furthermore a buccal incision was performed 9 days after trepanation. The antibiotic therapy was maintained for only 7.5 days due to lack of compliance on part of the patient. During the first seven days, the root canals were purified and rinsed, and treated locally with drugs (Ledermix®, later Calxyl®) three times altogether. The daily insulin dose and blood glucose values were documented. Mean values were calculated from measurements taken 21 days before and after the dental therapy.

**Results**

Fig. 1 shows short-term insulin values of daily insulin before and after the root canal therapy.

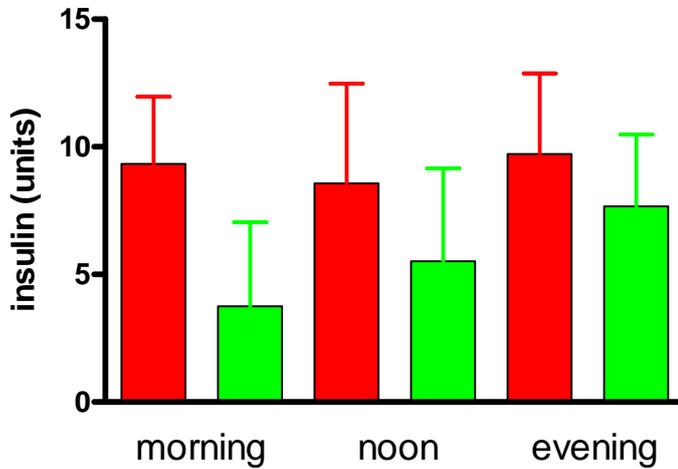


Fig 1: Short-term insulin values 21 days before (red columns) and after (green columns) the root therapy. There is a marked decrease of insulin needed .

The need for insulin was markedly reduced to about 41%, 64% and 79% for the morning, noon and evening dose during the 21 days after the root canal therapy in relation to the 21 days before.

Fig. 2 shows the short-term insulin doses 4 days before and after the root canal therapy. The need for insulin was markedly reduced to about 38%, 25% and 63% of the initial values for the morning, noon and evening dose.

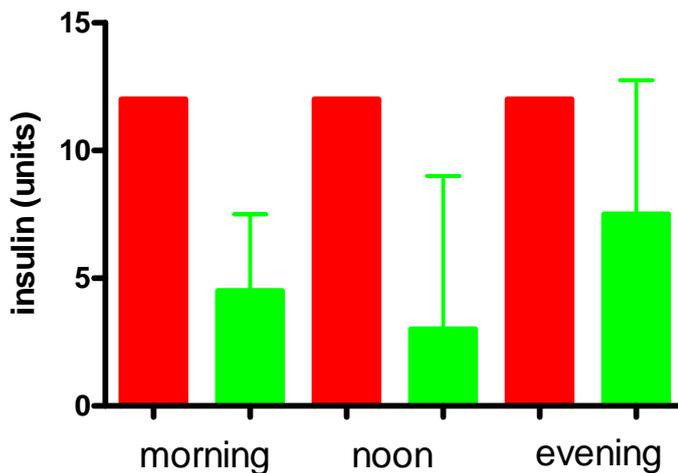


Fig 2: Short-term insulin values 4 days before (red columns) and after (green columns) the root therapy. There is a marked decrease in the needed insulin .

Fig. 3a gives the long-term insulin values for 21 days before and after therapy. The need for overnight insulin decreased to about 53% of pre-root canal therapy values.

In Fig. 3b, the respective values for 4 days before and after the root therapy are given. The insulin dose decreased to about 47% of pre-root canal therapy values.

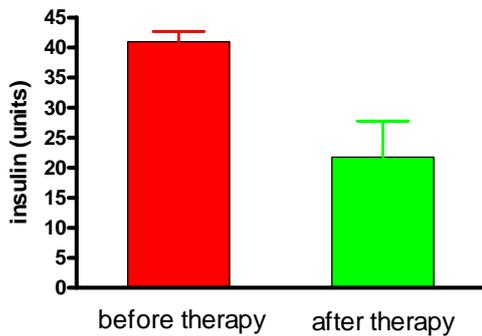


Fig. 3a

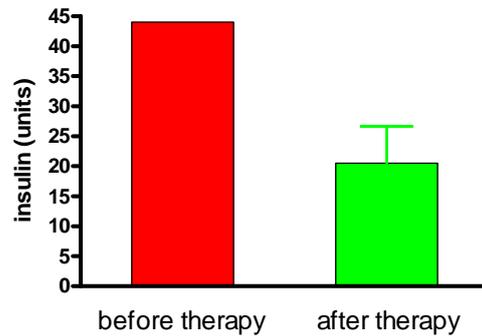


Fig. 3b

Fig 3: Long-term insulin values 21 days (Fig. 3a) and 4 days (Fig.3b) before (red columns) and after (green columns) the root therapy.

Fig.4 shows the blood glucose values 21 and 4 days, respectively, before and after the root canal therapy. A

minor decrease in blood glucose occurred after the therapy.

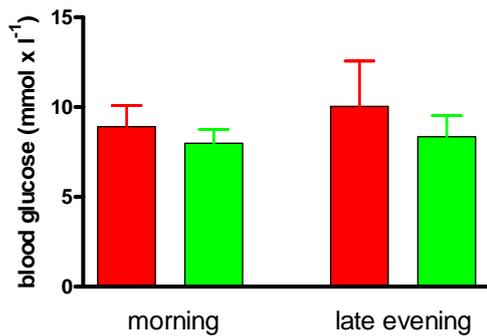


Fig. 4a

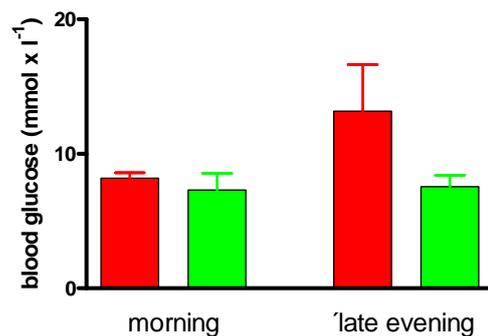


Fig. 4b

Fig 4: Morning fasting and late evening blood glucose values 21 days (Fig. 4a) and 4 days (Fig.4b) before (red columns) and after (green columns) the root therapy.

The most prominent decrease in the need for insulin due to decreasing blood glucose values

occurred in the first 4 days after the root canal therapy.

### Discussion

About three weeks before the root canal therapy was performed, the patient had noticed an increasing need for insulin. The need for more insulin was clearly the result of the high blood glucose values measured, in particular four days before the dental treatment, even though the insulin dose was at its maximum four days before the initiation of therapy. The patient himself supposed that there might be a relation between a "prickling" in his tooth (16) and corresponding exacerbating blood glucose values.

This case shows that suddenly increasing blood glucose values and an increasing need for insulin in diabetic patients may occur on the basis of an inflammation. The immediate and persisting decrease of needed insulin to about 50% of the initial value after the trepanation, without any lifestyle changes, verifies a cause and effect relationship between inflammation and insulin resistance. This corresponds with a number of studies which point to the same conclusion (1,2,3,4,5). Inflammation markers such as IL-6, TNFα

or CRP were not measured before and after the dental therapy. Only CRP was measured nine days after the tooth trepanation and local drug application. This value was low at the time of measurement (2.0 mg/l).

A sudden increase in diabetic patients' blood glucose values could point to an inflammatory process. A thorough examination should be undertaken to diagnose the inflammation, which could be caused by tooth decay or periodontitis.

## Literature

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