

Intraoperative ozone application to improve apicectomy results

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Introduction:

Apicectomy of a tooth is considered the final treatment available for retention of a tooth if all prior procedures, such as endodontic treatment, have not had the desired result. The success rate of apicectomy is, according to the literature, 75-90% [7,9] and can be assessed after about six months by clinical examination and x-ray check. This method has proven to be successful as a surgical means of attempting to retain the diseased teeth. However, in spite of carefully conducted surgical procedures, cases occur in which apical periodontitis is not healed or recurs after an apicectomy. This pilot study is designed to show whether the success rate of apicectomy can be improved with the intraoperative use of ozone for periapical disinfection. A secondary purpose is to assess the reduction of postoperative pain and swelling after apicectomy. Ozone is a well-known and commonly used disinfectant in dentistry [1,2,3,4,6,8].

Material and method:

After mobilisation of a mucoperiosteal flap, the bone over the apical region was removed under local anaesthetic using a round drill cooled with physiological saline solution and the pathological area was fully exposed. The granulomatous and/or cystic tissue was removed and the apex of the root was shortened by about 3 mm and smoothed. The integrity of the root canal filling was visually checked at the resection cross-section. If leakage was visible, the root canal filling was replaced or a retrograde filling was conducted.

After confirmation of the indications, a total of 58 patients received apicectomies. The periapical region in 29 patients was disinfected with ozone gas (Prozone, W&H) for 48 seconds after the apicectomy and retrograde preparation of the root canal and then the area was rinsed with physiological saline solution. The remaining 29 patients underwent the same surgical procedure, except that the periapical region was not disinfected with ozone, but the region was rinsed with physiological saline solution.

After repositioning the mucoperiosteal flap and fixing it with several sutures, the postoperative situation was checked by x-ray. The patients in both groups were asked about their pain situation by telephone on the first day +/- 1 day after the operation. The patient was requested to assess the momentary pain using a pain scale ranging from 0 (no pain) to 10 (very severe pain). The sutures were removed 7-10 days later. The patients were clinically examined again, and once again asked about their pain.

postoperative procedure was as follows:

- postoperative x-ray examination (digital dental film)
- Recall 1: by telephone on the 1st day +/- 1 after the operation, postoperative pain survey.
- Recall 2: on the 7th to 10th day +/- 1 after the operation, removal of sutures and clinical examination of the soft tissue, pain and swelling.
- Recall 3: three months after the operation, clinical examination of the soft tissue, pain and swelling, x-ray examination (digital dental film).

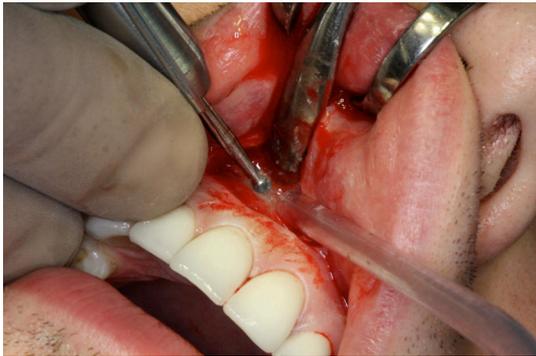


Fig. 1: View of lesion



Fig. 2: Status after apicectomy

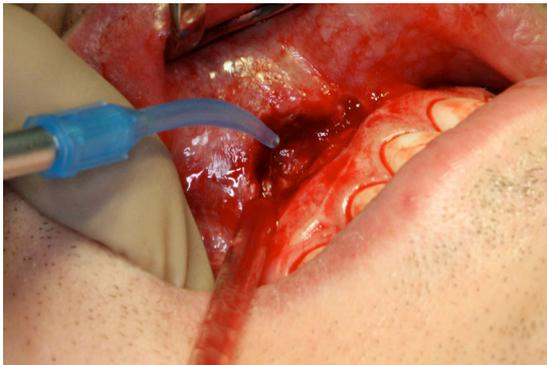


Fig. 3: Disinfection with ozone gas

Results:

The postoperative pain on the 1st day +/- 1 and on the 7th-10th day +/-1 was rated from 0 to 10 on a pain scale as shown in Fig. 4.

The maximum pain level of 10 was not reached. When ozone was used during the operation, postoperative pain on the 1st and 7th days was reduced compared to patients with whom ozone was not used.

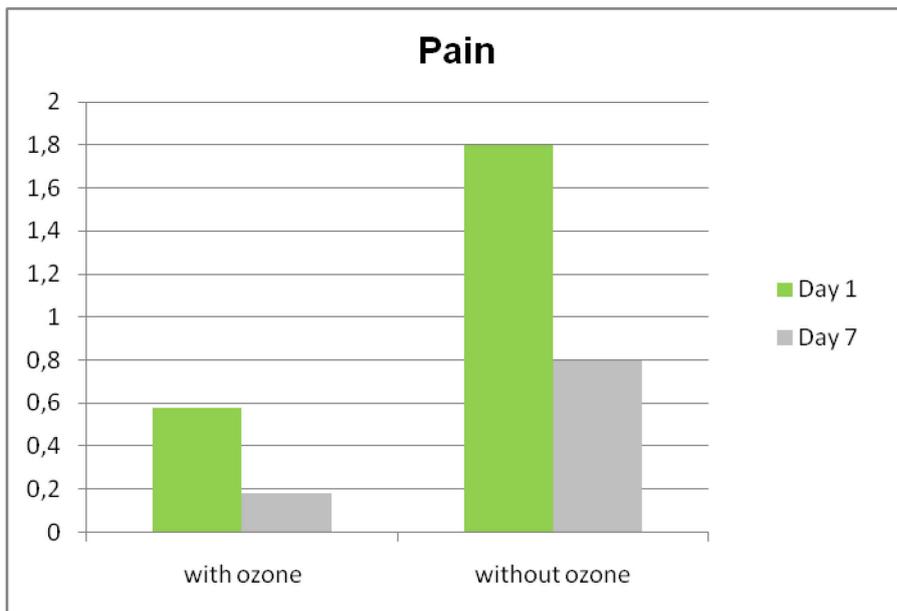


Fig. 4: Pain sensation with and without intraoperative ozone disinfection

The swelling on the 7th day after the operation was assessed by yes or no. See Fig. 5 for the results.

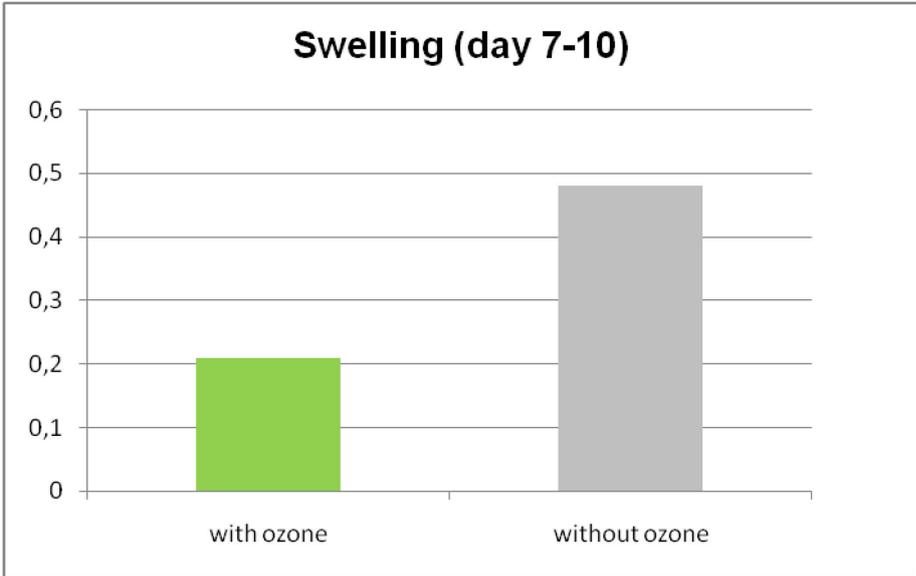


Fig. 5: Swelling on the 1st day after the operation by yes-no decision

The x-ray film was also assessed by yes-no after three months. Yes means apical brightening visible. No means no apical brightening visible. See Fig. 6-8 for the results.

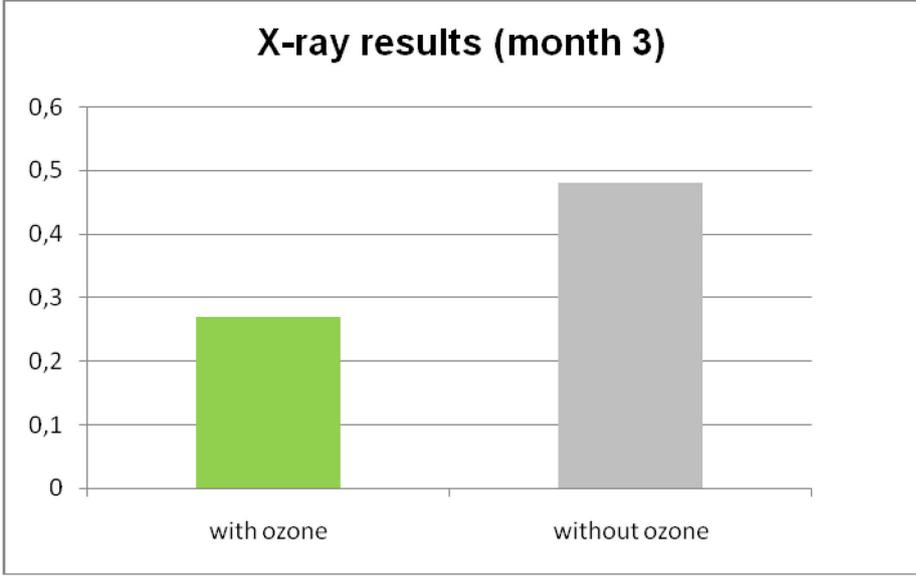


Fig. 6: Apical brightening three months postoperative (yes-no decision)



Fig. 7: Preoperative dental film 11 with planned apicectomy with ozone

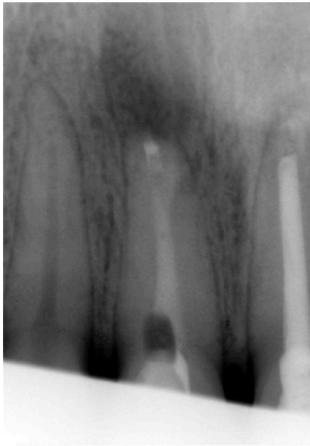


Fig. 8: X-ray results in dental film three months postoperative

Conclusion:

Apicectomy with intraoperative application of ozone to decontaminate the surgical site is a fast and practicable method.

It also reduced postoperative pain and swelling.

However, the real improvement in therapy is shown in the long-term survival statistics of a tooth subjected to apicectomy. This study has succeeded in demonstrating a trend indicating that intraoperative application of ozone during apicectomy represents an improvement in therapy.

However, further studies and survival checks are required to confirm this trend.

Literature:

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