CASE REPORT

APPLICATION OF ULTRASONIC DEVICES IN MANAGEMENT OF PERIODONTAL LESIONS - BONE RESPONSE IN A CASE OF A TOOTH WITH POOR TREATMENT PROGNOSIS

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ПРИЛОЖЕНИЕ УЛЬТРАЗВУКОВЫХ АППАРАТОВ В ЛЕЧЕНИИ ПЕРИОДОНТАЛЬНЫХ ПОРАЖЕНИЙ – РЕАКЦИЯ КОСТНОЙ ТКАНИ ЗУБА С ПЛОХИМ ПРОГНОЗОМ ЛЕЧЕНИЯ

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ABSTRACT

BACKGROUND: Surgical treatment of odontogenic jaw cysts may include one of the following four basic methods: enucleation, marsupialization, staged combination of marsupialization and enucleation, or enucleation with curettage. Enucleation/cystectomy, alone or combined with other procedures, is the preferred choice of treatment.

OBJECTIVE: The aim of the case report was to present the outcome of an ultrasound-assistant periapical cystectomy in a frontal upper tooth with indications for extraction. **RESULTS:** Postoperative recovery was uneventful. The functional result was satisfactory. On the follow-up X-rays a reduction of the intraosseous defect by a new bone formation could be observed. **CONCLUSION:** We found ultrasonic surgery to be a promising approach for safe and effective odontogenic jaw cyst removal reducing the risk of its recurrence.

Key words: bone regeneration, periapical cystectomy, piezosurgery

Folia Medica 2015;57(3&4):257-260

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РЕЗЮМЕ

ВВЕДЕНИЕ: Хирургическое лечение одонтогенных челюстных костей включает четыре основных метода: энуклеация, марсупиализация, комбинация энуклеации и марсупиализации, энуклеация с выскабливанием. Энуклеация / цистэктомия, самостоятельно или в комбинации с другими процедурами является предпочитаемым методом лечения. **Цель:** Представленный клинический случай демонстрирует эффект применения ультразвук-ассистированной периапикальной цистэктомии переднего зуба с показанием к удалению. **Результаты:** Послеоперационный период прошёл гладко. Функциональное восстановление является удовлетворительным. Контрольная рентгенография установила уменьшение размера внутрикостного дефекта за счёт образования новой кости. **Заключение:** По нашему мнению ультразвуковая хирургия является многообещающим методом надёжного и эффективного удаления одонтогенных кист челюстей, применение которого снижает риск рецидива.

Ключевые слова: регенерация костной ткани, периапикальная цистэктомия, пьезохирургия

Folia Medica 2015;57(3&4):257-260

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INTRODUCTION

Ultrasonic devices are well known and have proven their applicability and profits to conventional instruments for years.¹ In the literature there are some trials about the effect of the physical phenomenon

‘ultrasound’ in periodontal bone surgery.² Nevertheless, the latest case reports of the efficiency of piezosurgery in outpatients removing jaw cysts are few.^{1,3,4} The ultrasound-assisted procedures provide appropriate control of bleeding and visualization

Article's history: Received: 10 Oct 2015; Accepted: 9 Feb 2016

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over the surgical field, selective action in hard tissues without damaging the soft ones and precision in osteotomies.⁵⁻⁹ Based on above mentioned benefits we decided to make an attempt at management a periapical cyst in a tooth with indications for removing.

CASE REPORT

A 23 year-old female saw a second medical advice about a periodontal lesion detected on an X-ray. Her main complains were of discomfort and tenderness in upper left second incisor as well its crown discolouration (Fig. 1).

Figure 1. Preoperative X-ray. Before the endodontic retreatment of tooth 22.

The patient was diagnosed with periodontal cyst and a conservative management by root canal re-treatment was proposed. Five months later, after endodontic treatment, the patient came back with a new X-ray on which an enlargement of the lesion could be seen (Fig. 2).

Following patient's informed consent about the poor prognosis of the outcome an ultrasound-assisted cystectomy was performed despite the extent of bone loss. Because of the risk of disturbance of the tooth stability and based on the properly performed root canal obturation no apical resection was carried out. All osteotomies were completed by an ultrasonic device (Woodpecker® ULTRA-SURGERY) at 24 – 29 kHz working frequency and program for bone surgery 'BONE Quality 1' and bone cutting tips US 2, UL 3 with tip depth tissue penetration up to 7.5 mm. Bone cavity walls were cleaned also by the means mentioned. Destruction of the palatal bone was detected intraoperatively

and the nearby passing nerves were exposed. No other complications occurred during the surgery. The postoperative recovery was uneventful. During the follow-up period, clinical exams were performed and periapical images were taken to detect any recurrences. A considerable reduction of the bone defect could be observed on the X-rays and an initial repair of the periodontal space around the affected tooth was also detectable (Figs. 3 and 4).

Figure 2. Preoperative X-ray. 5 months after the endodontic re-treatment of tooth 22.

DISCUSSION

Piezo-osteotomy applies micro-vibrations of 60 – 200 μms^{-1} at 24 – 29 kHz.¹⁰ Exactly these characteristics in combination with the water-cooling system determine the manipulation benefits of the ultrasonic devices: decreased intra- and postoperative bleeding, improved dexterity and less traumatic tissues effects.⁵⁻⁹ In addition to the clinical advantages of these devices their atraumatic action is also histomorphologically proved. Osteocytes in the area of osteotomy are with intact nuclei despite the direct ultrasound application. The relief of bone morphogenetic factors is more powerful and the action of the pro-inflammatory cytokines is reduced.^{5,11-14} These statements correspond to our observations and practical experience in the case presented. They explain the uneventful patient's recovery and positive outcome without occurrence of any sensory disorders or recurrence of the periodontal lesion.^{3,15}

Figure 3. Follow-up X-ray. 5 months after the surgery.

Figure 4. Follow-up X-ray. 10 months after the surgery.

CONCLUSION

Based on literature data and its evidence-based approval we believe the ultrasonic devices and piezo-surgery are advantageous in bone surgery. The osteotomies are performed in a safe and effective maneuver increasing the likelihood for positive postoperative outcome even in doubtful cases like the presented one.

ACKNOWLEDGMENTS

Grant support was received from the Medical University, Plovdiv, Bulgaria, № MU-06/2015.

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