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ORIGINAL ARTICLE

ASSESSMENT OF COMPLICATIONS OCCURRING IN PATIENTS UNDERGOING ORTHODONTIC EXTRACTION OF MAXILLARY FIRST PREMOLARS USING ABSORBABLE COLLAGEN SPONGES IN EXTRACTION SOCKETS

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ABSTRACT:
Background: Angle favored non-extraction orthodontic treatment based on the concept of the occlusion line, in early eighteenth century. Special post-operative care is taken by surgeons while doing extractions to avoid complications. Despite these efforts, immediate postoperative sequelae such as bleeding, pain, swelling, and trismus often occur. Hence; we conducted the present study to assess the complication rates after using absorbable type-I collagen sponges in extraction sockets of patients undergoing orthodontic maxillary first premolar extractions. **Materials & methods:** In the present study we analyzed postoperative complications after using type-I collagen sponges following orthodontic extractions of maxillary first premolars. A total of 100 patients were included and dental extractions were performed followed by placement of type-I collagen plugs into the extraction sockets before wound closure. Surgical complications post-operative was analyzed and was assessed by SPSS software. **Results:** Significant results were obtained while comparing complications in patients undergoing surgical and non-surgical extractions. **Conclusion:** Complications could be minimized following topical application of type-I collagen sponges in the extraction sockets.
Key words: Collagen, Extraction, Orthodontic

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INTRODUCTION

Since the early days of orthodontics the need for tooth extractions in certain orthodontic situations has been discussed. In the early twentieth century, Angle favored non-extraction orthodontic treatment based on the concept of the occlusion line.[1-3] Special post-operative care is taken by surgeons while doing extractions to avoid complications. Despite these efforts, immediate postoperative sequelae such as bleeding, pain, swelling, and trismus often occur and may result in more serious postoperative complications like surgical site infection (SSI), alveolar osteitis (AO), hematoma, and paresthesia. These complications are mostly transient and the incidence rates are low, but these complications can inconvenience the patients' daily social lives and may be costly and timeconsuming with the necessary additional visits.[4-6] Several risk factors associated with complications after extraction include age, gender, medication, site of extraction, smoking, previous infection, poor oral hygiene, anesthesia, and the surgeon's experience.[7-9]

Hence; we conducted the present study to assess the complication rates after using absorbable type-I collagen sponges in extraction sockets of patients undergoing orthodontic maxillary first premolar extractions.

MATERIALS & METHODS

The present study was conducted in the department of orthodontics and oral surgery of the dental institute and included analysis of postoperative complications after using type-I collagen sponges following orthodontic extractions of maxillary first premolars. A total of 100

patients were included and dental extractions were performed followed by placement of type-I collagen plugs into the extraction sockets before wound closure. Ethical approval was taken from institutional ethical committee and written consent was obtained after explaining in detail the entire research protocol. Surgical extractions were performed with a full-thickness mucoperiosteal flap reflection and odontomy, ostectomy using elevators, whereas the simple extractions were performed using elevators and forceps without flap elevation. Assessment of the extraction site of the patient was done when the patient visited the clinic for stitches removal or postoperative discomfort. All the patients were divided into two study groups with 50 patients in each group. Patients in the first group underwent surgical extractions, while patients in other group underwent simple extractions followed by placement of absorbable collagen sponges. All the results were analyzed by SPSS software. Student t test and one way ANOVA were used for the assessment of level of significance.

RESULTS

Table 1, 2 and 3 shows the comparison of complications occurring in patients undergoing surgical and non-surgical extractions. Significant results were obtained while comparing the complications in patients undergoing surgical and non- surgical extractions.

Table 1: Correlation of Incidence of AO according to type of extraction

Parameter		AO	p-value
Type of extraction	**Surgical**	4	0.01 (Significant)
	Non-surgical	1	

Table 2: Correlation of Incidence of SSI according to type of extraction

Parameter		SSI	p-value
Type of extraction	**Surgical**	3	0.02 (Significant)
	Non-surgical	1	

Table 3: Correlation of Incidence of hematoma according to type of extraction

Parameter		Hematoma	p-value
Type of extraction	**Surgical**	2	0.04 (Significant)
	Non-surgical	0	

DISCUSSION

We planned the present study to assess the complication rates after using absorbable type-I collagen sponges following third molar extractions. In the present study, on comparing the surgical and non-surgical extractions for the presence of complications, significant results were obtained. Stalpers MJ et al assessed treatment outcomes in Class II Division 1 patients who were treated orthodontically with extraction of the maxillary first permanent molars and to describe the changes in their facial profiles. This was a prospective, longitudinal, 1-group outcome analysis in a private practice, with outcome evaluation by independent observers at an academic clinic. One hundred consecutively treated patients were enrolled prospectively and treated by 1 orthodontist. The inclusion criteria were white, Class II Division 1, sagittal overjet of > or =4 mm, extraction of maxillary first permanent molars, no missing teeth or agenesis, maxillary third molars present, and 1-stage full fixed appliance treatment. Standardized lateral cephalometric radiographs were made before and after active treatment. Occlusal outcome was scored on dental casts by comparing pretreatment and posttreatment casts with the peer assessment rating (PAR) index. Backward regression analysis was used to explain the soft-tissue changes on the basis of dental changes and the soft-tissue characteristics. The mean reduction in weighted PAR score was 89.9%. During treatment, the lower lip retruded 1.6 mm relative to the esthetic line. The nasolabial angle became 2.1 degrees more obtuse during treatment. Overjet reduction and initial upper lip thickness could explain 15% of the variation in upper lip position. The changes in the position of the mandibular incisor relative to the Point A-pogonion line and initial lower lip thickness could explain 23% of the variation of lower lip position. Orthodontic treatment involving extraction of the maxillary first permanent molars has a good treatment outcome. Extraction of the maxillary first permanent molars has only a small effect on the soft-tissue profile.[10] Almeida LE et al investigated the influence of oral contraceptives on the incidence rate of alveolar osteitis (AO) following the surgical extraction of both impacted mandibular third molars. This retrospective study reviewed the clinical records of patients who presented to the oral surgery clinic of a university school of dentistry for the extraction of impacted mandibular third molars. Using a database search, all patients were categorized by sex, age, occurrence of AO, and whether the females were taking oral contraceptives at the time of surgery. The patient was considered positive for AO if either one or both sockets developed AO. The incidence of AO among women taking oral contraceptives at the time of impacted mandibular third molar extraction differed significantly from that in the other patient groups. AO occurred in 37.9% (11/29) of females taking oral contraceptives, while only 8.9% (16/179) of females who were not taking oral contraceptives at the time of extraction developed AO. The total incidence of AO among females was 13.0% (27/208). The total incidence

of AO among the 363 males and females presenting for mandibular third molar extractions was 13.8%. Females who are taking oral contraceptives at the time of impacted mandibular third molar extraction are at a higher risk of developing AO following extraction.[11]

Tolstunov L et al evaluated the role of socket irrigation with a normal saline solution routinely used at the end of extraction on the development of alveolar osteitis (AO) after removal of impacted mandibular third molars (MTMs). Thirty-five patients who satisfied the inclusion criteria were involved in the study and underwent extraction of four third-molars. The patient's right (operator) side was an experimental side; it also had a standard extraction technique of an impacted mandibular third molar at the beginning with a flap and osteotomy, but it was followed by a modified end-of-surgery protocol. It consisted of gentle curettage but the socket was not irrigated and not suctioned. It was simply left to bleed. The gauze was placed on top of the socket for haemostasis on both sides and the patient was asked to bite. On both sides, the buccal flap was positioned back without the suture. Thirty-five patients or 70 sockets were evaluated. Eleven out of 35 patients in the study were subjected to a dry socket syndrome (31.4%). The higher number of AO was likely related to specifics of MTM selection in this study - only impacted (partial and full bone) MTMs were chosen. Among eleven patients with AO, two patients had a bilateral condition. By excluding two patients with bilateral dry sockets from the study, there were nine patients (18 extraction sites) with unilateral AO in the study. Seven out of nine patients (14 extraction sites) developed unilateral dry socket on the control (irrigated) side (77.8%) and only two (four extraction sites) on the experimental (non-irrigated) side (22.2%). Therefore, in this study there were 3.5 times more patients (extraction sites) with dry socket syndrome on the irrigated (control) side than patients (extraction sites) in the non-irrigated (experimental) side. A noticeable difference of dry socket syndromes (77.8% on the irrigated versus 22.2% on non-irrigated side) was demonstrated between the traditional extraction protocol versus modified approach without the end-of-surgery irrigation.[12]

CONCLUSION

The authors conclude that Complications could be minimized following topical application of type-I collagen sponges in the extraction sockets in patients undergoing orthodontic extractions. However, future studies are recommended for better exploration of results.

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