

The Local Effects of Kinesiologic Tape, Non-Steroidal Anti-Inflammatory Drug (Diclofenac Sodium Ampoule) on Post-Operative Sequelae after Surgical Reduction of Mandibular Fracture: A Comparative Study

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ABSTRACT

Introduction: Surgical intervention of mandibular traumatic fractures is a known modality in faciomaxillary surgical work. Frequently escorted by aching, swelling, postsurgical disability is a main difficulty, disturbing human quality of daily activities. The application of Kinesiology tape in certain cases of fracture mandible increases the blood and lymphatic stream, eliminating congested fluids of lymph and blood contents.

Aims of this prospective clinical study were to estimate if the use of Kinesiology tape would inhibit or recovers edema, pain post mandibular fracture surgical reduction.

Materials and Methods: Twenty cases were enrolled for management of mandibular fractures and were haphazardly distributed into two treatment groups, either Kinesiology tape group or none- Kinesiology tape group with administration of non-steroidal anti-inflammatory drug (Diclofenac sodium ampoule). Tape was applied directly after surgery with the direction of the underneath muscles and continued for five days post-operatively. Facial puffiness was assessed and evaluated by a three-line dimension at four precise anatomic locations, then the mean of them taken. Pain score was evaluated. Patient's subjective sense and gratification was questioned.

Results and Discussion: showed that use of Kinesiology tape post mandibular surgery slightly lower the occurrence of edema and reduced the extreme level for more than 60% throughout the first two days' post-surgery. Although, Kinesiology tape has no clinical significant effect on pain controller post-surgery in the Kinesiology tape group related to the none-Kinesiology tape group.

Conclusion: Kinesiology tape in certain selected cases of mandibular fracture is an encouraging, humble, less disturbing, inexpensive, free from bad responses.

Key words: Kinesiology tape, Surgical reduction of mandible.

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INTRODUCTION

The facial bones are immensely prone sites for injuries and maxillofacial zone has one of the maximum described of damages in the human skeleton specifically the mandible, has a higher tendency for maxillofacial injury compared to any other bone of the cranium. This tendency can be explained by the protruded position, mobility and particular shape of the mandible which eventually may lead to the loss of function and unreversed damage [1,2]. The U-shape of the mandible has an important feature known as the 'ring bone rule', which states that in case of a fracture in one location, another fracture or displacement

will most likely to appear over the opposite side [3]. The mandible considered as responsible for 15.5%- 59% of the facial bones fractures [4] and has been rated as the 2nd facial bone with the highest rate of injuries. Recent reports have shown that the usage of a seatbelt and automatic airbags within the vehicle have drastically reduces the chance for the passengers to suffer from fracture during a car accident. Due to better and safer technologies in the last few years, the incidence and patterns of facial bones fractures among passengers in their vehicles have reduced [5]. The epidemiological publications related to maxillofacial trauma varies from nation to another and also season relation. Facial traumas also depend on other influences, like demography, socioeconomically situation, sexual characteristics, stage of development etc. [6] researchers showed that traumas and personal quarrel and RTAs were the chief causal etiology for mandibular

fractures [7]. In relation to anatomical locations, nose and zygomatic complex and mandible fractures were the common in maxillofacial traumatic injuries and their incidence differs in relation to age and gender and the mechanical principles of trauma [8]. Kinesio Taping had become a good and promising beneficial means in skeletal and muscular systems, neurology and lymph flow, KT created by Ristow et al. [9] Recent clinical researches presents that KT can increase blood flow and lymph drainage by eradicating lymph fluid and haemorrhages [10], nevertheless not all existing suggestion supports its use and therefore there have been no high excellence researches to framework its physiological properties [11]. Inflammatory effects that came along with mandible trauma may led to focusing on using other modalities to shorten the time and clinical signs and symptoms of the surgical work. Researchers justify the immediate reduction of the fractured pieces within 72 h while others advocate a lengthier time in order to permit a reduction in inflammatory effects of the neighboring maxillofacial soft tissue [12-14]. The effect of the neighbouring soft tissue swelling, pain on the treatment consequence stay an issue of constant discussion [12]. Though, problems from mandibular trauma often progress before, throughout or post-surgical treatment either in emergency or definite work [15].

MATERIALS AND METHODS

The clinical research was carried out at Al-Salam teaching hospital consultation of maxillofacial Surgery unite, after taking the approval from scientific committee under number 4S/735 in 10-4-2018. A case sheet specially planned for this study was occupied for each case. Twenty physically healthy cases were randomly chosen with age from 18 to 32 years of male and female. The diagnosis of fracture mandible was depending on clinical findings and standard panoramic radiographs and lateral oblique and PA mandible views. Inclusion criteria: Unilateral fracture involving body of mandible and simple type with no skin involvement and adequate number of teeth present for arch bar application as trans osseous wiring regarded as non-rigid fixation and patient not taking anti-inflammatory drugs, exclusion criteria: Multiple or compound fracture of mandible or with a history of compromised medical status, history of allergy or hypersensitivity to KT, Expectant mother or breast fed mothers, and cases rejected being enrolled in research. Entirely the cases were performed by the one oral and maxillofacial surgeon, all of the cases of fracture mandible were surgically reduced under general anesthesia and arch bar applied to upper and lower teeth then the surgical reduction of the fracture mandible was performed following the standard procedure including intraoral approach as most cases of body fracture are of unfavourable type, full thickness mucoperiosteal flap from mesial surface of lower first molar and extended posteriorly to retro molar area then trans osseous wiring done according the line of mattresses by using surgical hand piece with irrigation with Chlorhexidine 0.2%. Following reduction, suturing of the flap was done by

simple interrupted suture and sling suturing. The operating area was irrigated again with Chlorhexidine 0.2%. Then the patient recovered from general anaesthesia and transferred to surgical ward then maxillomandibular fixation done. The patients were arbitrarily allocated to two treatment groups; KT group included ten patients; and Non KT group ten patients by putting KT extraorally post-surgery for five days. On completion of surgery all patients were given Ceftriaxone 1 g Vial (Zuche Pharmaceuticals Pvt. Ltd, India) every 24 hours I.V. daily for three days for both groups, and Diclofenac sodium 75 mg Amp. (Novartis, UK) deep I.M. (intragluteal injection) into the upper outer quadrant using aseptic technique every 24 hours daily for two days then giving Diclofenac suppositories for next days on need for non KT group only. For KT group given Paracetamol 1gm injection (GMP-Manufacturer-Medicine, China) as a rescue analgesic.

The cutaneous tissue was washed and dried from wetness and grease pre use of new modality; if necessary shaving done. Tape applications were achieved using skin-colored Kinesio tape (KINESIO TEX gold blue and beige color, China), Tape dimension was measured for each case from the ear lobule to the point of mandibular mid line. Reading data was carried out in a stretched position. The tape was sectioned into 2 equal strips (0.5 cm each). Tape tail was rounded down. The tape was judiciously peeled from the paper backing to avoid stirring the adhesive. The patient was moved into a stretched position. Tails were placed on the skin with slight tension (20%). post application, the tape was rubbed informally to trigger the medical-grade acrylic adhesive. KT was left for at least five days (Figure 1A).

Readings preoperatively taken to be base line measurements for both groups then another reading taken for day one and day three and day seven for swelling. Post-surgery pain was assessed subjectively by means of the visual analogue scale. The visual analogue scale comprises of a 10 cm line fasten at one side by the label 'No pain' and at the other side 'Worst probable pain'. The patient scripts on the line the spot for the pain potency which is then calculated [16]. Assessment of swelling was also subjectively assessed and as follows: 3 facial measurements by means of flexible calculating tape to estimate in milli-meter as a baseline numbers for recording the facial edema, which include: Tragus-midline (Pogonion) and Tragus-Commissure and Gonion lateral canthus extraorally measurement of swelling then mean taken for all measurement for each patient [17], as shown in (Figure 1B).

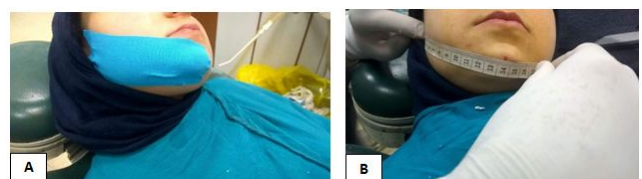


Figure 1: A: Measurement's. B: KT application post-operative.

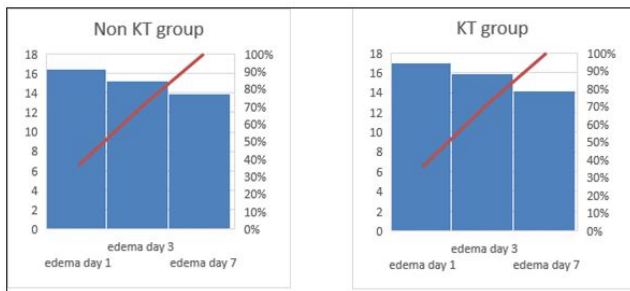


Figure 2: Comparison between groups for edema parameter at day 1, 3 and 7.

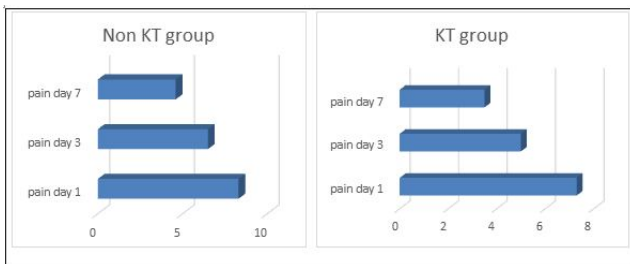


Figure 3: Comparison between groups for pain parameter at day 1, 3 and 7.

Table 1: Mann-whitney test for pain and edema at day 1, 3 and 7.

Parameter	Group	Mean rank	p value
Pain day 1	Non KT group	13.6	0.012*
	KT group	7.4	
Pain day 3	Non KT group	14.45	0.002*
	KT group	6.55	
Pain day 7	Non KT group	13.5	0.016*
	KT group	7.5	
Edema day 1	Non KT group	11.2	0.594
	KT group	9.8	
Edema day 3	Non KT group	10.8	0.814
	KT group	10.2	
Edema day 7	Non KT group	11.55	0.409
	KT group	9.45	

*P value significant ≤ 0.05

DISCUSSION

This clinical research was planned to assess the influence of multi medications. Ultimately all the parameters and readings of post-operative sequelae existed to performed quantitatively, which decreased the influence of case unfairness. In this research the non KT group regarded (Voltarin ampule) as a standard group as it is used empirically in mandibular reduction as a NSAIDs, except in certain cases. The total number of patient is restricted due to exclusion criteria that limits number of cases. Evaluation of edema was done by evaluating imaginary lines present on the known points on the face: simple easy quick and time-saving manner, delivers information for readings of tissue alterations. Which was utilized in previous researches [18] Unbiased evaluation of pain by calculating the quantity of painkiller tablets. A high positive relationship was present between the two readings, a conclusion which is analogous to that gained by further investigators [19]. Numerous researches on

Data for pain and swelling recorded for day one, three, seven post operatively. Statistics of the data was achieved using independent T test. Non parametric test, Mann-Whitney Test, Analysis were performed using SPSS program version 22 windows 2013. A highly significant difference was considered at $p \leq 0.05$.

RESULTS

This study included 20 patients (5 females and 15 males; mean age range 18-32 years). Addition of KT post-surgery for mandibular traumatic fracture had a significant value in statistics and also has an influence on soft tissue response and edema, declining the occurrence of edema by more than 50% during the first two days' post-surgery. Even though KT had no direct significant effect on ache control, cases in the KT group obvious lowering morbidity. As shown in Table 1. The comparison between groups according to the edema and pain parameter shown in Figures 2 and 3.

the control of post-operative swelling in maxillofacial surgical intervention. In wisdom teeth surgery examination of the effectiveness of manual lymphatic drainage by enhancement of lymphatic circulation and functioned in an adjunctive part for decreasing post-operative edema and ache [20], While KT has been progressively used in the recovery protocols and stoppage of athletic trauma, there is no pure indication concerning probable tools [21]. KT has a minor effect on the decrease of swelling and hemorrhage. These researchers suggest an optimistic influence on the development of lymphatic fluids by reopen the micro valves in the preliminary lymph vessels, consequently producing suitable active compression difference and adequate intermittent firmness and alleviate higher pressure of superior and underneath preliminary lymphatics. Agreeing with other researchers KT enables reduction of ache by decreasing on nociceptors [8]. Works displays usage of KT post "orthognathic" surgical work has an important effect on tissue response and

edema was slighter for the KT group. Maximum edema frequently happens second to third day post operation. Though, using KT means highest edema was touched post five days with obvious inferior standards in comparison with the no-KT group. Besides, decrease of edema was sooner in the KT group in comparison with the non-KT group, reducing the edema throughout the first two days' post-surgical work [9] which is agree with our results. In a study these developed creases are not only denting, but also uplifting the skin. [8], which agree with ours, no decline in pain scores was seen by Gonzalez et al for the KT group. Further readings accomplished are in agreement with these results [22]. May be due to painkiller treatment protocol. The maximal edema characteristically occurs about the 2nd post-operative day, KT has a property of stretch ability up to 140 % of its length and consequently withdrawals back to its innovative length. When used appropriately, this property produces a dragging power subsequent in the typical skin complexities underneath the taped region, which in sequence are believed to rise the interstitial spaces between skin above and connective tissue below, therefore supporting the current of blood and lymph [23]. The researchers theorized that use of KT would reduce the occurrence of edema within 24 hours' post-surgery, the results of Oliver Ristow et al research showed that the use of KT post ORIF of MF obviously dropped the occurrence of edema within the first 48 hours' post-surgery. There are no reduction effects on ache stimulation [24]. A study done by Danuta L-K et al on effects of KT on edema post orthognathic surgery, use of the lymphatic KT method post orthognathic surgery showed a valuable outcome on the decrease of edema [25] which agreed with our results.

CONCLUSIONS

Kinesiology tape has an effect on reducing the edema and swelling that formed post mandibular reduction surgical procedures and also no or minimal sensible effects on ache mechanism post-surgical in the KT group. Therefore, KT in certain cases of mandibular fracture is an encouraging, humble, less upsetting, inexpensive, and free from adverse side effects interaction.

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