

## Prognosis of Teeth in the Line of Mandibular Fracture: 5 - Year Clinical and Radiological Follow-up

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### ABSTRACT

**OBJECTIVE:** The purpose of this article is to highlight our experience with the prognosis of teeth retained in the line of mandibular fracture after treatment of the fracture.

**PATIENTS AND METHODS:** A prospective evaluation of 62 patients with 200 teeth in the line of mandibular fracture seen and treated at the Dental and Maxillofacial Clinic, University of Calabar Teaching Hospital, Calabar south-south Nigeria between 2005 and 2009 was carried out. The focus was on 96 teeth in the line of mandibular fracture retained after reduction and immobilization of the fracture by closed reduction technique. The clinical and radiological follow-up period of patients ranged between six months and 3.5 years.

**RESULTS:** Majority of the patients 33 (53.2%) were in their third decade of life. The age of patients' ranged from seven to 48 years with a mean of  $24 \pm 2.3$  years. There were 48 (77.4%) males and 14 (22.5%) females giving a male-to-female ratio of 3.4:1. One hundred and four teeth (52%) out of the 200 were extracted during treatment of the fracture. Of the remaining 96 teeth, 25 (26.0%) were anterior teeth while 71 (73.9%) were posterior. Twenty-four (25.0%) of the teeth in the line of fracture developed complications. Of those teeth involved with complications 10 (41.7%) were incisors and canine while 14 (58.3%) premolars and molars. Hypersensitivity and discolouration were the predominant complications.

**CONCLUSION:** Appropriate case selection and thorough clinical and radiological assessment is required to reduce the rate of complications of teeth left in-situ in the mandibular fracture line after treatment. The various complications in this study were managed successfully

**KEYWORDS:** Teeth in the line of mandibular fracture; Clinical and radiological evaluation; Prognosis

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### INTRODUCTION

The controversy concerning the proper approach to teeth in the line of mandibular fracture has existed in the literature.<sup>1,2</sup> Teeth in the line of mandibular fracture have been the subject of great debate because it is a very difficult factor to evaluate due to the many confounding variables affecting its prognosis.<sup>3,4</sup> The routine practice

of removing teeth from a mandibular fracture line does not appear to be mandatory for successful healing to occur.<sup>5,6</sup> The policy adopted of removing only those teeth which were obviously damaged by the injury and all unerupted teeth dislodged into the fracture line appears to be appropriate.<sup>1,2,7</sup> As stated by James et al<sup>8</sup>, teeth in the fracture line aid fixation and so doctrinal sacrifice of them would appear to be unwarranted. Studies have also shown that conservative treatment of teeth involved in the line of mandibular fractures has a favorable prognosis especially if optimal reduction of the jaw fragments is achieved<sup>9,10</sup>. The type of fracture and the treatment modalities for the fracture also play the important role in the prognosis of the teeth in the line of fracture. Kamboozia and Punnia-Moorthy<sup>10</sup> in their study observed that 68% of teeth in the line of fracture in patients treated with the plates were non-vital, as compared to 41% in the wired group, while 71% of teeth adjacent to the fracture line were non-vital in the plated group, as compared with 14% in the wired group. Of the total of 35 non-vital teeth in the whole group, 63% were seen in type I fracture, and 49% were related to minimal and 51% to gross displacement of fractures.

The management of teeth positioned in the line of mandibular jaw fractures was studied by Kahnberg and Ridell in a follow-up examination of 132 patients with mandibular fractures involving 185 teeth. The observation period varied from 1 to 3 years. The clinical and radiographic findings revealed complete recovery in 59% of the involved teeth. The degree of periodontal and pulpal complications was closely related to the displacement between the fragments and to the type of fracture. Six different fracture types were classified with regard to the extent of involvement of the tooth supporting tissue; 23% of the teeth which initially responded negatively to electric stimulation showed positive sensibility at the time of re-examination. Thus, a long time observation period is advisable with regard to the final outcome of the pulp damage. Conservative treatment of teeth involved in the line of mandibular fractures has a favourable prognosis especially if optimal reduction of the jaw fragments is achieved. The purpose of this article is to highlight our experience with teeth left in-situ in the line of mandibular fracture after treatment of the fracture.

### PATIENTS AND METHODS

We carried out a 5-year prospective evaluation of 62 patients with 200 teeth in the line of mandibular fracture

seen and treated at the Dental and Maxillofacial Surgery Clinic, University of Calabar Teaching Hospital, Calabar south-south Nigeria between the calendar years of 2005 and 2009 (5 years). The focus was on 96 teeth in the line of mandibular fracture retained after reduction and immobilization of the fracture by closed reduction technique without any susceptible pathology both clinically and radiologically. Excluded from the study were those teeth in the line of fracture that were broken, displaced or loose as a result of the trauma and those with doubtful prognosis. The patients' were reviewed clinically and radiologically using peri-apical radiographs during the postoperative period. Information obtained and documented in a tabular form included patients' age, gender, type of teeth involved, complications and treatment modalities. The data obtained was subjected to statistical analysis using EPI info 2000 version software.

## RESULTS

Table 1 show the age and gender distribution of subjects. Majority of the patients 33 (52.2%) were in the third decade of life. The age of patients ranged from seven to 48 years with a mean of  $24 \pm 2.3$  years. There were 48 (77.4%) males and 14 (22.5%) females giving a male to female ratio of 3.4:1. The fractures healed successfully within four to six weeks after treatment. A total of 200 teeth were involved in the line of fracture; 104 (52%) out of these were extracted during treatment. Of the remaining 96 (48%) teeth, 25 (26.0%) were incisors and canine while 71 (73.9%) were posterior. Of the 24 (25.0%) teeth involved with complications, 10 (41.7%) were anterior teeth while 14 (58.3%) were posterior. Table 2 shows the complications recorded during the follow-up period. Hypersensitivity eight (8.3%) and discolouration seven (7.2%) were predominant. Table 3 shows the different treatment modalities used to manage the various complications successfully. The follow-up period of patients ranged between six months and 3.5 years. The attendance at follow-up was influenced by the presenting complication and its management. All the patients kept follow-up appointments within the first six months from the commencement of treatment of the fracture. Thereafter appointments were kept haphazardly and some absconded when they felt they were not coming to the hospital for anything serious.

Table 1: Age and gender distribution

| Age groups (years) | Male | Female | No. of patients | %    |
|--------------------|------|--------|-----------------|------|
| 0-10               | 3    | 0      | 3               | 4.8  |
| 11-20              | 9    | 3      | 12              | 19.3 |
| 21-30              | 25   | 8      | 33              | 53.2 |
| 31-40              | 7    | 1      | 8               | 13.0 |
| 41-50              | 4    | 2      | 6               | 9.6  |
| Total              | 48   | 14     | 62              | 100  |

Table 2: Type of complications

| Complications                | No. of teeth | %    |
|------------------------------|--------------|------|
| 1. Hypersensitivity of teeth | 8            | 7.2  |
| 2. Discolouration of crown   | 7            | 8.3  |
| 3. Periodontal abscess       | 5            | 5.2  |
| 4. Periodontitis             | 3            | 3.2  |
| 5. Dentoalveolar abscess     | 1            | 1.1  |
| Total                        | 24           | 25.0 |

Table 3. Treatment of complications

| Treatment                             | No. of teeth | %     |
|---------------------------------------|--------------|-------|
| 1. Antibiotics and calcium supplement | 21           | 41.0  |
| 2. Root canal therapy                 | 17           | 33.3  |
| 3. Extraction of teeth                | 7            | 14.0  |
| 4. Post-retained crown                | 6            | 11.7  |
| Total                                 | 51           | 100.0 |

## DISCUSSION

From the available literature<sup>1-10</sup>, the fate of teeth in the line of mandibular fracture is unpredictable and that is responsible for the controversy surrounding the line of management to be adopted when the injury does not affect the tooth directly. Bradley<sup>9</sup> reviewed a series of 103 patients with fractures of the mandible and advocated extraction of all teeth in the line of fracture for fear of complications if teeth were retained. However, more recent reports<sup>7,10</sup> have advocated a selective approach. These authors observed that with appropriate case selection and antibiotic therapy, teeth can be retained to aid fixation and ultimately serve its function. Likewise Chuong et al<sup>1</sup> stated that there was no significant difference in the rate of complication when cases with teeth in the line of injury treated by extraction (14.0%) were compared with those treated with retention of teeth (11.0%). They advocated the extraction of teeth in the line of injury that are significantly mobile, have root exposure in markedly distracted fractures, or interfere with either reduction or fixation of the fractures. They concluded that these selection criteria should be applied to all cases, and no absolute statement concerning the retention or removal of teeth in the line of mandibular fractures should be made. The findings in the present study are in line with the observations made by these authors. The overall rate of complication (25.0%) obtained is lower than that of Passeri et al<sup>3</sup> (100.0%) but higher than that of Zachariades and Papademetriou<sup>11</sup> (13.1%). These complications probably arose from the impaired blood supply to the teeth in the line of fracture, in addition to the closure of the apices of those teeth before the accident occurred. Kamboozia and Punnia-Moorthy<sup>7</sup> reported that the incidence of loss of vitality of teeth in the line of fracture is 68.0%. The percentage of anterior teeth involved with complications was more compared with posterior teeth. This may be explained by

the more cortical than cancellous bone in the anterior region of the mandible making it less vascularized than the posterior part with more cancellous bone. Also some of the posterior teeth have double roots thereby making vascularization better. The age and gender disposition in the present study is the same as in other studies<sup>12,13</sup>. The preponderance of males with mandibular fractures could be attributed to habits and occupation. We found in the present study as recorded by Dahlstrom et al<sup>14</sup> that one of the difficulties in the audit of mandibular fractures is the failure of patients to keep follow-up appointments. Though, Mitchell<sup>15</sup> found that in comparing patients' characteristics based on those presenting for follow-up and those who did not, there was no reason to suspect that the drop-out rate would influence the number of complications. In the present study, those that failed to complete their follow-up appointments may not have had further complications that would warrant coming to the hospital.

### CONCLUSION

Complications of teeth in the line of mandibular fractures when left in-situ after treatment of fracture is still obtainable despite advances made in the management of this condition. Appropriate case selection is required to reduce this complication rate.

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