Reduced Mouth Opening Following Tonsillectomy in Children: Myth or Reality

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ABSTRACT
Objective: To evaluate whether tonsillectomy in children leads to subsequent reduction in mouth opening.
Study Design: Cohort study.
Place and Duration of Study: Department of ENT/Head and Neck Surgery, Combined Military Hospital, Peshawar, from October 2005 to December 2006.
Methodology: A total of 42 children undergoing tonsillectomy (Group A = requiring insertion of a mouth gag) and 44 patients undergoing myringotomy or septoplasty (Group B = control group) were included in this cohort double blind study. Patients having pre-operative temporomandibular joint (TMJ) dysfunction, undergoing any other surgery in addition to tonsillectomy e.g. adenotonsillectomy, aged under 4 or above 15 years, and patients lost to follow-up were excluded. Painless, maximum interincisal distance (MID) was measured pre-operatively with a Vernier Calliper. Because of the inconsistency of mouth opening in children, three readings per individual were taken and the maximum recorded. Patients were followed up at 1, 2, 4, 12 and 26 weeks postoperatively in the ENT OPD and respective MID readings recorded.
Results: After a transient reduction in mouth opening, at the 26th week follow-up, 100% patients had reverted to their pre-operative MID measurements.
Conclusion: Reduced mouth opening in children, after tonsillectomy is a transient finding returning to normal by about the 26th postoperative week.

Key words: Tonsillectomy. Trismus. Temporomandibular joint. Children.

INTRODUCTION
Tonsillectomy is one of the most common surgical procedure performed in children.¹,² Use of a mouth gag during tonsillectomy is an integral part of this procedure, providing adequate visualisation of the entire operative field for proper dissection³ and subsequent haemostasis. Theoretically extensive surgical trauma to the peritonsillar structures, excessive mouth opening with a mouth gag and postoperative fibrosis of the tonsillar bed / soft palate following tonsillectomy, may lead to subsequent reduction in mouth opening. The temporomandibular joint (TMJ) is instrumental in opening and closing the mouth.⁴ Prolonged and excessive mouth opening as in tonsillectomy operation may lead to TMJ dislocation or pain due to post-operative joint dysfunction. In ENT practise, temporary dislocation of the TMJ may occasionally occur during tonsillectomy, however, it is corrected promptly at the operating table, while the patient is still relaxed and anaesthetised. Pain caused by temporomandibular disorders originates from either muscular or articular conditions, or both.⁵ A pathology outside the TMJ causing restricted mouth opening is termed pseudo- or extra-articular ankylosis.⁶,⁷ Post-tonsillectomy morbidity, mainly in the form of pain in the throat,⁸ also results in restricted mouth opening.

Despite these pre-disposing causes which may lead to a reduction in the normal mouth opening, hardly any patient in the long-term follow-up after tonsillectomy complains of reduced mouth opening. This paradox may be misleading as majority of the patients undergoing tonsillectomy are from the paediatric population, unable to correctly convey their symptoms. A need to scientifically document this potential aftermath of surgery prompted this study.

The objective of this study was to evaluate wether tonsillectomy in children leads to subsequent reduction in mouth opening.

METHODOLOGY
Patients undergoing tonsillectomy (requiring insertion of a mouth gag) and myringotomy or septoplasty (control group: not exposed to the mouth gag) at the Combined Military Hospital, Peshawar, from October 2005 to December 2006 were included in this cohort double blind study. There was no gender restriction. Informed consent was taken from the parents of the patients and approval obtained from the hospital Ethical Committee. Patients having pre-operative TMJ dysfunction, undergoing any other surgery in addition to tonsillectomy e.g.
adeno-tonsillectomy, aged under 4 or above 15 years, and those lost to follow-up were excluded.

A detailed history was elicited and thorough physical examination including TMJ function was performed. Painless maximum interincisal distance (MID) was measured pre-operatively with a Vernier Calliper to gain an additional digit of accuracy compared to a simple ruler. Because of the inconsistency of mouth opening in children, three readings per individual were taken and the maximum was recorded.

All patients underwent surgery under general anaesthesia with endotracheal intubation assisted with a McIntosh laryngoscope. Careful and gentle insertion of the Boyle's Davis mouth gag with an appropriate sized tongue blade was ensured, taking care to avoid injury to the lips, teeth, fauces and posterior pharyngeal wall. A second reading of MID was taken with the mouth gag opened and secured. This was done to monitor how far the mouth was opened beyond the pre-operative MID, with the help of a mouth gag, in an anaesthetised patient. At the end of surgery, the mobility of the jaw was ensured. All surgeries were performed by a senior consultant.

Patients were followed-up at 1, 2, 4, 12 and 26 weeks postoperatively in the ENT OPD. Similarly postoperative TMJ and MID assessment was done. The parents were enquired about any postoperative talking / eating problem they might have noticed in their child. The pre- and post-operative MID readings were recorded by a doctor blinded to the study.

The statistical analysis was performed using “software package for statistical analysis” (SPSS-10). Measurements obtained with a Vernier Calliper were documented as mean ± standard deviation (SD). Paired student's t-test was used for calculating p-values. A p-value of < 0.005 was considered significant.

RESULTS

The age of patients in the tonsillectomy group ranged from 4 to 15 years (mean age 9.0 ± 3.24 years) and in the control group ranged from 3 to 15 years (mean age 8.2 ± 3.28 years). Male to female ratio was 1:1.4.

In the tonsillectomy group, the mean pre-operative interincisal distance was 38.8 ±1.92 mm (ranging from 34.9 to 42.9 mm). After deploying the Boyles' Davis mouth-gag per-operatively, it increased as expected, to a mean 41±1.92 mm; an increase in mouth opening of 2.22 mm during surgery.

All patients were discharged from the hospital on the first postoperative day. In the post-tonsillectomy group 100% patients (n=42) complained of odynophagia and altered speech with pain localised to the tonsillar fossae but there were no TMJ symptoms e.g. clicking or joint pain. The MID remained transiently reduced post-operatively in 100% patients (n=42), and by the 12th week it had gradually returned to the pre-operative reading in almost 83% patients (n=35). At 26 weeks follow-up the mean maximum interincisal distance recorded was 39.1±1.94 mm (ranging from 35.6 to 43.6 mm) which was in fact fractionally more (0.23 mm) than the pre-operative reading (38.8±1.92 mm, p=0.002). The mean MID recordings at 1, 2, 4, 12 and 26 weeks postoperatively are shown in Figure 1.

At one week follow-up, 93% patients (n=39) had odynophagia, 76 % (n=32) had sore throat, while 40% (n=17), had altered speech. Almost all patients in the post-tonsilstectomy group were asymptomatic on the 4th week follow-up and only 5% patients (n=2) complained of altered speech. By the 12th week all the patients were symptom free. The postoperative reduction in symptoms is displayed in Figure 2.

In the control group, there was no change in the mean pre- and postoperative interincisal distance i.e. 36.9 ±1.90 mm (ranging from 26.2 to 48.0 mm).

No temporary dislocation of TMJ was encountered.

Figure 1: Mean pre-operative (Pre-op) MID compared with the mean post operative (post-op) readings over 26 weeks.

Figure 2: Comparison of reduction in post-tonsillectomy symptoms (n=42).
DISCUSSION

Tonsillectomy despite being a common and simple procedure is replete with a myriad of complications i.e. haemorrhage, pain and dehydration. Rarely subcutaneous emphysema, taste disorders, cervical osteomyelitis, mediastinitis etc., may occur, consequently resulting in substantial morbidity and mortality.

Luckily the complication rate following tonsillectomy is reasonably low. A large study by Gallagher reviewing 4776 cases revealed a complication rate of 1.7 ±0.4%.9 Similarly another study by Schmidt discussing post-tonsillectomy complications documents mainly haemorrhage, pain and dehydration.10 Other studies describe a complication rate of 1.3% in 1977 operated cases.11,12 In this study no primary or secondary haemorrhage was encountered, nor were there any readmissions on account of pain or dehydration.

A search of medical literature, internet and Cochrane reviews revealed only two references on trismus following tonsillectomy. Both implicated the temporomandibular joint. Gupta described fracture of the mandibular condyle as a rare complication of tonsillectomy,13 while Maini claimed a reduction in normal mouth opening following tonsillectomy.14 She attributed this to temporomandibular joint dysfunction. Her results, and the paucity of literature on reduced mouth opening following tonsillectomy, impelled the authors to carry out the present study. With the advantage of having a larger number of patients, longer follow-up time and a purely paediatric population, the results of this study are in contrast with those of Maini.

Normal adult mouth opening ranges between 23 and 71 mm measured between the incisor teeth; in children, the ability to position three fingers between the upper and lower incisors with the mouth wide open can be considered a simple method to quickly evaluate maximum mouth opening.15

The maximal interincisal distance, i.e. linear mouth opening, is generally used as a measure for TMJ mobility and is significantly related to condylar mobility.16,17 Trismus,18 sore throat and otalgia experienced in the immediate postoperative period are caused by inflammation,19 irritation of exposed sensory nerve endings and spasm of the underlying, exposed pharyngeal muscles.

According to an audit by Royal College of Surgeons England, it takes 2 weeks or longer for the symptoms to settle completely following tonsillectomy.20 In this study, the complaints of sore throat and odynophagia had settled by the third week and only 4.7% patients had altered speech at the 12th week follow-up. Meticulous, gentle dissection in the natural plane along with minimal electro-cautery result in early recovery. In the study by Alho, children had a sore throat that lasted an average of 13 days after the operation,21 while in the present study sore throat lasted almost 10 days.

Careless, traumatic surgery with loss of mucosa, particularly on the soft palate can result in scar tissue in the palate resulting in subsequent limited mouth opening. The gradual return of normal MID in this study is in contrast to Maini’s study, probably because their follow-up time was limited to the 6th postoperative week while here the patients were followed-up to the 26th postoperative week. Secondly three readings were taken and the maximum reading was documented. Thirdly since tonsillectomy is performed mainly in the paediatric population, who respond better to surgical trauma compared to the adults, the upper age limit of 15 years in this study probably contributed to the favourable results.

No TMJ symptoms were encountered in this study compared to 11% in Maini’s study. This may be because of the fact that deployment of the mouth gag in this study only marginally increased the MID, imparting no additional stress to the temporomandibular joint.

CONCLUSION

Tonsillectomy may hypothetically lead to reduced MID due to scarring of the tonsillar bed, along with TMJ dysfunction attributed to excessive force applied by the deployment of a mouth gag but this study has proved that gentle mouth opening with a mouth gag followed by meticulous dissection and minimal diathermy precludes the chances of postoperative reduced mouth opening. Following tonsillectomy, reduced mouth opening in children, thus appears to be only a transient feature.

REFERENCES


