



New Approach in Extraction of Impacted Wisdom Teeth

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Neurosensory deficit is a significant risk in lower wisdom tooth surgery. Due to the anatomical positions, the lingual nerve (LN) and inferior dental nerve (IDN) are at risk in the procedure, resulting in tongue numbness with taste disturbance in LN injury, or lower lip numbness in IDN injury on the affected side. The prevalence of LN and IDN deficits in the literature are 0.1-22% and 0.3-8.4%, respectively. As there were no local data, our centre has initiated a series of studies to determine the local prevalence of neurosensory deficit after wisdom tooth surgery, the relevant risk factors contributing to the neurosensory deficit, and to investigate the safety of coronectomy, which is a new technique of wisdom tooth surgery to prevent IDN injury.

Local Prevalence of Neurosensory Deficit after Wisdom Tooth Surgery

We conducted a prospective cohort study of 4338 wisdom tooth surgeries between 1998 and 2005 in the Prince Philip Dental Hospital, which is by far the largest study reported in the literature¹. All surgeries were performed in the Local Extraction Clinic by operators of various grades from undergraduate students to specialists. The prevalence of LN and IDN injuries were 0.69% and 0.35%, respectively. These figures were relatively low when compared to those reported in the literature. 66.7% of IDN deficit and 72.0% of LN deficit recovered fully within the follow-up period of 24 months. It was also noticed the recovery of the neurosensory deficit was most significant in the first 6 months after the injury.

Significant Risk Factors Contributing to Nerve Deficit

The next question is what factors contribute to the risk of neurosensory deficit?

To investigate the risk factors of nerve deficit after wisdom tooth surgery, we have conducted a systematic review on prospective studies on this clinical issue, which is considered as a study design with the highest level of evidence in the era of evidence-based medicine². Without any limitation of languages and years of publication, 3 literature data-bases were searched. Additional reference search was performed and the articles were evaluated by 2 independent judges with pre-set criteria. 32 articles were qualified to enter the final review. We concluded in our study that increased age, unerupted wisdom tooth and the "old-fashion" lingual split technique are significant risk factors

and LN deficit. Raising of the lingual flap, which is supposed to protect the LN from rotary instruments, is also a risk factor to LN deficit at least on a temporary basis. In contrast, the risk of IDN deficit is increased with the depth of the impaction or exposure of IDN intra-operatively, which is easily explained by the proximity of IDN to the tooth roots and the increased difficulty of the surgery. Several radiographic signs, e.g. darkening of wisdom tooth root and deflection of ID canal, are also positively related to the risk to IDN deficit. The prevalence of IDN deficit happened more on operators with more surgical experience in our study, which is due to the case selection bias because of the fact that specialist oral surgeons need to manage wisdom teeth of higher difficulties, yet this also reflects IDN deficit may not be totally avoidable even in the hands of experienced surgeons. In cases where the wisdom tooth root is lying in close proximity to the IDN, or occasionally the nerve even creates a groove onto the tooth root, taking the tooth out will likely compress or even transect the IDN, leading to permanent IDN deficit.

Coronectomy: A New Method of Wisdom Tooth Surgery

Coronectomy literally means cutting off the crown from a tooth. It is a new method of wisdom tooth surgery in selected cases aiming to remove the crown of the wisdom tooth while leaving the root in situ. The crown of the wisdom tooth is usually the cause of various oral health problems, such as pericoronitis or dental caries of the wisdom tooth itself or the second molar in front of it. By removing the crown can resolve these problems, yet leaving the root behind can avoid injury to the IDN which is in close proximity. It had been a taboo in dentistry that leaving the tooth roots in the jaw was believed to be a source of dentoalveolar infection. The technique was first described by Knutsson et al. in 1989 but was not popularised due to the reported complications of root exposure and infection from the technique³. Several articles have reported this technique with less complications and more promising results, yet it was understandable that dentists and oral surgeons would not be convinced until a well-designed study can show its safety in terms of reduced risk of IDN and other surgical complications. Therefore our centre has conducted a randomised clinical trial to compare coronectomy with the traditional total removal of lower wisdom teeth⁴. The study included patients with wisdom tooth root lying in close proximity to ID canal as shown with one or more radiographic sign on an orthopantomogram. The radiographic signs were:

1. Darkening of the root
2. Abrupt narrowing of the root
3. Interruption and loss of the white line representing the ID canal
4. Displacement of the ID canal by the roots
5. Abrupt narrowing of one or both of the white lines representing the ID canal

The study excluded patients whose wisdom teeth were not in close proximity to IDN, with systemic or local factors that predisposes to infection, or any pulpal caries, cystic or neoplastic pathology relating to the wisdom tooth.

The procedure of coronectomy included flap raising and bone guttering down to the cemento-enamel junction of the impacted wisdom tooth. The crown was sectioned off from the root. Minimal stress to the root during crown elevation was required to avoid any root dislodgement. The root was further trimmed down 3-4mm below the crestal bone (Figure 1). Primary closure was then performed. No antibiotics were prescribed post-operatively.



Figure 1. Coronectomy: Crown removed and root trimmed down 3-4mm below crestal bone

231 patients with 349 lower wisdom teeth were randomised, with 178 wisdom teeth underwent total removal (as control group) and 171 wisdom teeth underwent coronectomy. 16 coronectomies (9.4%) were considered failed as the roots were dislodged during the procedure and were removed in total. The prevalence of IDN deficit was significantly lower in the coronectomy group (0.65%) when compared to the control group (5.1%) ($p=0.023$). The prevalence of pain and dry socket in the first week were also significantly lower in the coronectomy group than the control group. The infection rate in the first week showed no statistical difference between the two groups, and of note there was no infection in the patients who had coronectomy from post-operative 3 months onwards until the last review of 2 years. Serial radiographs showed significant root migration within the alveolar bone after coronectomy up to 3mm, and then gradually stopped at 1 year post-operatively (Figure 2a-d). There was only one case of root exposure into the oral cavity and required subsequent re-operation to remove the root.

The result of the coronectomy study was fascinating as it proved that this technique can significantly reduce the prevalence of IDN deficit in lower wisdom tooth surgery for the high risk group. The safety of coronectomy is

promising at least in the short term. A phase IV clinical trial of coronectomy is on-going in our centre to evaluate the long term safety of the technique.



Figure 2a. Pre-operative: Lower wisdom tooth in close proximity to IDN



Figure 2b. Post-operative 1 week: Crown removed and the root left in situ



Figure 2c. Post-operative 1 year: Coronal migration of the root by around 3mm



Figure 2d. Post-operative 2 years: No further migration of the root noticed.

References

1. Cheung LK, Leung YY, Chow LK, Wong MC, Chan EK, Fok YH. Incidence of neurosensory deficits and recovery after lower third molar surgery: a prospective clinical study of 4338 cases. *Int J Oral Maxillofac Surg.* 2010 Jan 8(in press)
2. Leung YY, Cheung LK. Risk Factors of Neurosensory Deficits in Lower Third Molar Surgery: An Evidence-based Review of Prospective Studies. *Int J Oral Maxillofac Surg.* (under review)
3. Knutsson K, Lysell L, Rohlin M. Postoperative status after partial removal of the mandibular third molar. *Swed Dent J.* 1989; 13: 15-22.
4. Leung YY, Cheung LK. Randomized Controlled Trial of Safety of Coronectomy versus Excision of Wisdom Teeth. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod.* 2009 Dec; 108: 821-7.