

Evaluation of surgical methods for sleep apnea and snoring

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Akademisk avhandling

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Abstract

Background: Snoring and obstructive sleep apnea (OSA) are both common disorders with a number of negative health effects. The safety and efficacy of treating snoring and OSA surgically have been questioned and there has been a lack of studies in the field.

Aims: 1) To investigate the frequency of serious complications, including death, after surgery for the treatment of snoring and sleep apnea; 2) to evaluate the effect on daytime sleepiness after radiofrequency surgery of the soft palate in snoring men with mild or no OSA; 3) to evaluate the effect of tonsillectomy on sleep apnea in adults with OSA and tonsillar hypertrophy; 4) to investigate the morphology and cytoarchitecture of muscle fibers in human soft palatal muscles with immunohistochemical and morphological techniques.

Methods and results: *In paper 1*, a retrospective database study. All Swedish adults who were treated surgically because of snoring or OSA from January 1997 to December 2005 were identified in the National Patient Register. None of the surgically treated patients died in the peri- and postoperative period. Severe complications were recorded in 37.1 of 1,000 patients treated with uvulopalatopharyngoplasty (UPPP), in 5.6 of 1,000 patients after uvulopalatoplasty (UPP) and in 8.8 of 1,000 patients after nasal surgery. *In paper 2*, the study was designed as a randomized, controlled trial. 35 snoring men with mild or no OSA were randomized to either radiofrequency or sham surgery of the soft palate. Radiofrequency surgery was not found to be effective since there was no significant difference between the two groups in relation to the Epworth Sleepiness Scale (ESS) or apnea-hypopnea index (AHI) at follow-up. *Paper 3* was a prospective study, including 28 patients with an AHI of >10 and with large tonsils. In these patients, tonsillectomy was an effective treatment for OSA; the mean AHI was reduced from 40 units/h to 7 units/h ($p < 0.001$), and the mean ESS was reduced from 10.1 to 6.0 ($p < 0.001$) at the six-month follow-up after surgery. Minor and moderate swallowing dysfunction was found in seven of eight patients investigated before surgery and the swallowing function improved in 5 of them after surgery, while no one deteriorated. *In paper 4*, we investigated the morphology and cytoarchitecture in normal soft palate muscles. Human limb muscles were used as reference. The findings showed that the soft palate muscle fibers have a cytoskeletal architecture and cellmembrane complex that differs from that of the limb muscles.

Conclusions No case of death related to surgery was found among 4,876 patients treated with UPPP, UPP or nasal surgery for snoring or OSA in Sweden between 1997 and 2005. Radiofrequency surgery of the soft palate has no effect on daytime sleepiness, snoring or apnea frequency in snoring men with mild or no OSA. Tonsillectomy can be an effective treatment for OSA in adults with large tonsils. A subgroup of muscle fibers in the human soft palate appears to have special biomechanical properties and their unique cytoarchitecture must be taken into account while assessing function and pathology in oropharyngeal muscles.

Keywords: Sleep apnea syndromes, adverse effects, mortality, radiofrequency, sham surgery, randomized controlled trial, daytime sleepiness, snoring, tonsillar hypertrophy, tonsillectomy, cytoskeleton, desmin, dystrophin, muscle fiber, palatopharyngeus, soft palate, uvula.

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