CURRICULUM VITAE

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Computer assisted surgical simulation and surgery in orthognathic surgery

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Recently, computer assisted surgery (CAS) has been introduced in oral and maxillofacial surgery, and has also been applied to orthognathic surgery. Some simulation software such as Dolphin 3D surgery (Dolphin Imaging & Management Solutions) and PROPLAN CMF (Materialise) can allow three-dimensional (3D) hard and soft tissue simulation including evaluation of bony interferences and correction of asymmetry. Additionally, 3D printer can provide surgical guide and wafer as well as 3D skeletal model. I report computer assisted surgical simulation and in-house 3D printing for orthognathic surgery in Yokohama City University Hospital.

Furthermore, I am interested in possibility of iatrogenic obstructive sleep apnea (OSA) after orthognathic surgery. Narrowing of the pharyngeal airway space (PAS) after orthognathic surgery has been implicated in the development of OSA, and thus has received increasing attention in recent years. Many studies have assessed PAS changes after orthognathic surgery, however most investigated the PAS only morphologically, using lateral cephalogram and/or computed tomography, and morphological analyses cannot show the airflow condition or airway pressure. Narrowing of the PAS leads to increased airflow velocity and subsequently to further reduction in intraluminal pressure and further pharyngeal narrowing. Airflow simulations using computational fluid dynamics (CFD) have recently been applied to patients with OSA. The information provided by CFD can help clarify the pathogenesis of OSA, and CFD analysis has been combined with pharyngeal airway geometries obtained before and after treatment to determine the effects on parameters such as pressure drop and flow resistance. However, few studies have used CFD to assess the possibility of OSA caused by mandibular setback surgery. Therefore, I describe new information of CFD study in mandibular setback surgery.