Diamond bur for suppressing heat generation in bone resection

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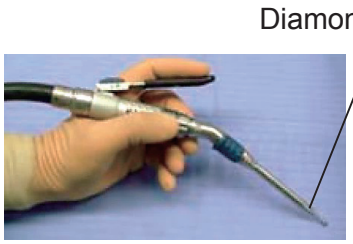
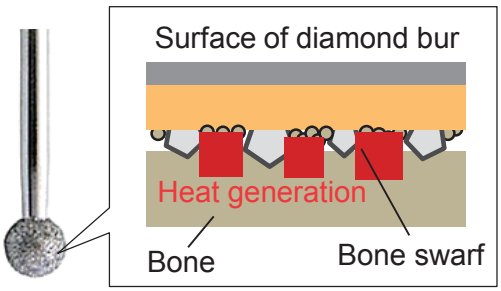
Project Outline

Diamond burs are commonly used to resect bone in surgery. However, temperature of surface of a bur inevitably increases during bone resection. It can not only deteriorate the rate of bone fusion after surgery but also lead to thermal injury to adjacent tissues. While saline solution is supplied to the resection area to reduce the bone temperature in practical surgeries, more effective and stable reduction is required. In this project, we found adhesion of the bone swarf on the surface of the bur can cause significant increase in the bone temperature and developed surface treated burs to suppress the adhesion of the bone swarf. In the resection experiments, the developed burs effectively suppresses the increase in bone temperature.



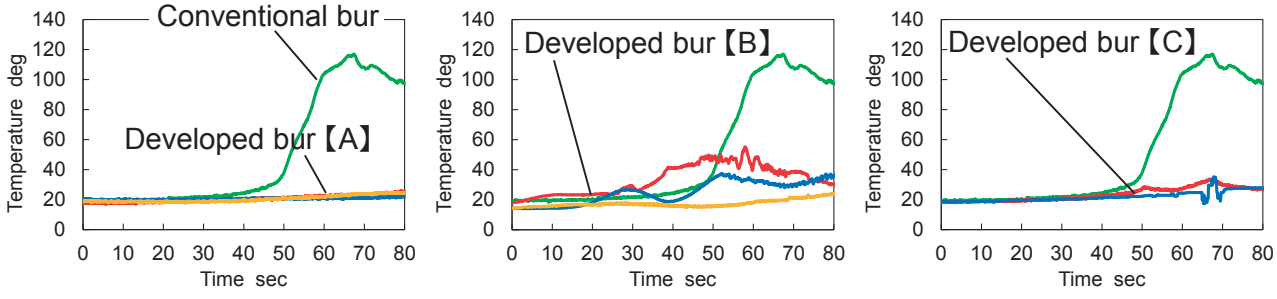
（Taketoshi Kushida：Orthopedics SURGICAL TECHNIQUE, 2, 3(2012), 319）



Developed diamond burs

【A】 Diamond burs with fixed PTFE particles by a fluorine-containing coating agent
【B】 Diamond burs with trifluoromethyl treated surface
【C】 Diamond burs with deposited TiO_2 particles

Experimental results　Changes in bone temperature during resection of bovine femoral cortical bone



Diamond burs are used to resect bone and teeth in orthopedics, neurosurgery, dentistry, oral surgery, ear nose and throat, and plastic surgery. In particular, they are commonly used in surgical treatment of spinal disease.