

New technique uses mortise and tenon joints to repair unstable shoulders

November 24 2020

Orthopaedic surgery techniques for treatment of recurrent shoulder instability are effective, but prone to problems with nonunion of bone grafts held in place by screws alone. A new technique—borrowing a design used for centuries in Chinese architecture and woodworking—provides an effective approach to shoulder stabilization, suggests a study in *The Journal of Bone & Joint Surgery*.

Inspired by the ancient woodworking technique of mortise-tenon joints, the "arthroscopic inlay Bristow procedure" provides a high success rate in patients with recurrent [shoulder](#) instability, according to the report by Guoqing Cui, MD, of Peking University Third Hospital and colleagues. Their technique "optimized the accuracy of graft positioning and resulted in a high rate of graft healing, excellent functional outcomes, and a high return to sports," the researchers write.

Initial experience shows good outcomes with 'inlay Bristow' technique
Recurrent anterior shoulder instability is a common problem among athletes, particularly those involved in collision or overhead sports. If shoulder dislocation becomes a recurrent problem, a [surgical procedure](#) may be necessary to stabilize the joint.

One popular surgical approach is the Bristow-Latarjet procedure, commonly performed arthroscopically. With this technique, a small "hook" of [bone](#) (i.e., the coracoid) is taken from the scapula and fixed with a screw to the glenoid bone, providing long-term anterior shoulder stability. This procedure has a good success rate in terms of preventing

future shoulder dislocations.

However, problems can occur when the graft doesn't heal properly, resulting in nonunion. This can lead to bone deterioration and displacement or breakage of the screw, potentially resulting in recurrent instability.

Thinking about how to make the shoulder repair more stable, Dr. Cui and colleagues were inspired by an ancient technique from Chinese timber building: the mortise-tenon joint. Known to carpenters and woodworkers everywhere, this technique uses a projecting piece of wood (the tenon) that precisely fits into a gap (the mortise) in another piece of wood to join the two pieces together.

In the researchers' new "inlay Bristow" procedure, the coracoid graft is trimmed to form a tenon, which is fixed into a mortise created in the glenoid bone. Dr. Cui and colleagues report the results of 51 patients who underwent the arthroscopic inlay Bristow procedure for recurrent anterior shoulder instability.

One year after the procedure, the coracoid bone graft had healed in 96 percent of patients, with only two patients experiencing a nonunion of the bone graft. Follow-up CT scans showed good graft positioning with little or no sign of bone degeneration.

Patients also exhibited improved function with the inlay Bristow procedure, with significant improvements in shoulder stability (Rowe score) and overall joint function (American Shoulder and Elbow Surgeons score) at a minimum follow-up of three years. Eighty-seven percent of patients were able to return to sport.

Inspired by traditional Chinese architecture, the arthroscopic inlay Bristow procedure provides a promising reconstructive approach in

patients with recurrent shoulder instability. The inherent strength of the mortise-tenon joint increases the contact area and proper positioning of the bone [graft](#), with high rates of bone healing and union and good clinical outcomes. Dr. Cui and colleagues note that further studies will be needed to confirm the reliability of the procedure, and compare the outcomes of the procedure with other treatments for recurrent shoulder [instability](#).

More information: Lin Lin et al. Cuistow: Chinese Unique Inlay Bristow, *Journal of Bone and Joint Surgery* (2020). [DOI: 10.2106/JBJS.20.00382](#)

Provided by Wolters Kluwer Health

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