

**CONGRATULATION TO ASSOCIATE PROFESSOR NIZLAN AND THE TEAM!
 AWARDED FOR 1ST RUNNER UP OF THE SANUSI GHANI AWARD**

No.	Content	Investigator/Collaborator
1.	<i>The PUTRA Technique for Chronic Acromio-clavicular (AC) Joint Reconstruction - When AC Ligament Matters</i>	 <ol style="list-style-type: none"> 1. Associate Professor Dr Mohd Nizlan bin Mohd Nasir Co-Investigators: 2. Dr Raymond Yeak Dieu Kiat 3. Dr Azlan Sulaiman 4. Dr Johan Abdul Kahar
2.	Award The 1st Runner Up of the Sanusi Ghani Award at the Malaysian Arthroscopy Society Annual Scientific Meeting 2021	
3.	What the project aims to achieve? To come up with a more stable technique for Chronic AC Joint reconstruction.	
4.	Why is it important? <ul style="list-style-type: none"> • There is a high incidence of failure of coraco-clavicular ligament reconstruction without incorporation of the AC ligament • There has also been reports of high incidence of pin-site infection with usage of Kirchner wires to stabilize the AC joint post-reconstruction • The PUTRA technique uses an internal brace for better stability of our biological CC and AC reconstruction 	
5.	How will it be done? This technique has been used for AC joint reconstruction in HPUPM since 2020.	
6.	Expected output? The clinical outcome is promising	

The PUTRA Technique for Chronic Acromio-clavicular (AC) Joint Reconstruction - When AC Ligament Mat

Chronic acromio-clavicular (AC) joint disruption poses a challenge to the treating surgeons due to the fact that coraco-clavicular (CC) restoration alone resulted in sub-optimal stability and subsequent loss of reduction. Techniques have evolved from simple CC fixation, reconstruction using synthetic devices and, of late, reconstruction with **biological augmentation**. Biological reconstructions which include acromio-clavicular (AC) ligament reconstruction have shown promising result as horizontal stability is also restored, and this is the technique used by UPM together with **TWO additional augmentation** procedures, as depicted in this case report.

Three patients with chronic AC joint disruption (def: post-traumatic period of more than 4 weeks) were seen at HPUPM's Orthopedic Clinic. All patients showed complete disruption of their CC and AC ligaments with **two (2) displaying Rockwood Type 5 and one (1) with Type 4** disruption. All three patients consented and underwent biological reconstruction of their CC and AC ligaments using hamstring autograft harvested from their left lower limbs. The construct of all three cases was done according to Figure1.

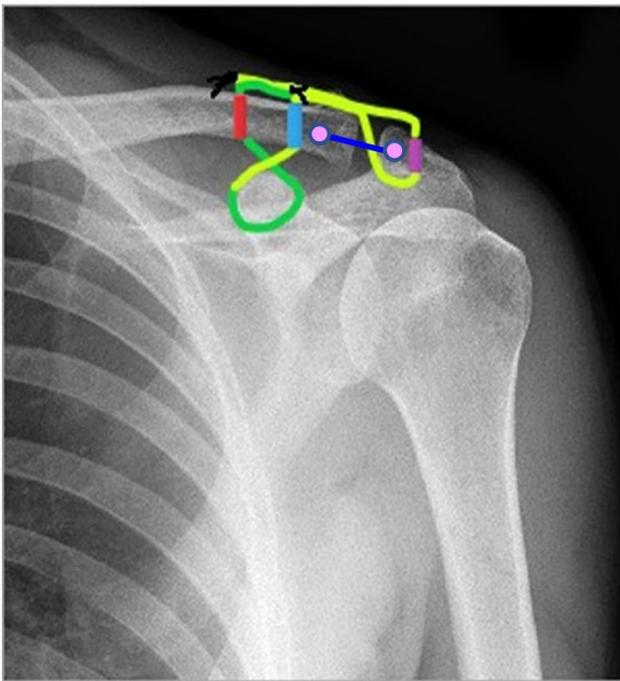


Diagram: The PUTRA AC Joint Reconstruction technique. The bright and dark green tracing represents the graft construct and the dark blue line with the pink dots represent the internal brace (IB) construct

Figure 1

Additional AC ligament reconstruction has been incorporated into CC ligament reconstruction following further understanding of its role in the stability of the AC joint¹. Unfortunately, there is paucity of AC ligament reconstruction techniques in the literature² and we have created the technique mentioned above. The residual length of the semitendinosus tendon was adequate to **extend the procedure laterally** to incorporate the acromio-clavicular articulation.

In conclusion, Additional AC ligament reconstruction is a crucial step in the reconstruction of the AC joint stability with end-to-end graft suturing and additional usage of internal bracing to augment the construct.

Figure 1 shows the construct of the AC joint reconstruction done for all 3 patients. Two 5-mm tunnels were created at the distal clavicle 3.5 cm (conoid) and 2.5 cm (trapezoid) from the distal end. The graft's end was fixed in the conoid tunnel (red colour) using a 4-mm biotenodesis screw (picture) with its end left free around 1 - 1.5 cm. The graft was then looped under the coracoid process and passed in a figure-of-eight fashion towards the trapezoid tunnel (blue). The distal clavicle was then reduced with slight over-reduction and the trapezoid tunnel graft fixed using another 4-mm screw.

The graft is then passed over the distal clavicle and under the acromial medial edge, subsequently passed from inferior to superior surface of the acromion through another 5-mm tunnel (purple); the graft is then looped back, overlapped and sutured to the free end of the graft on the other side of the construct (white arrow). This end-to-end suturing is one of our modifications to this technique.

After that, internal brace fixation was added using a 2-mm fiber-tape which was fixed at the clavicle side of the construct using a 4.75-mm swivel-lock anchor and another at the acromion side with a 3.5-mm anchor. The orientation of the internal brace varies, depending on the type of AC joint disruption. The usage of internal brace is the other additional augmentation procedure practiced by UPM team.