

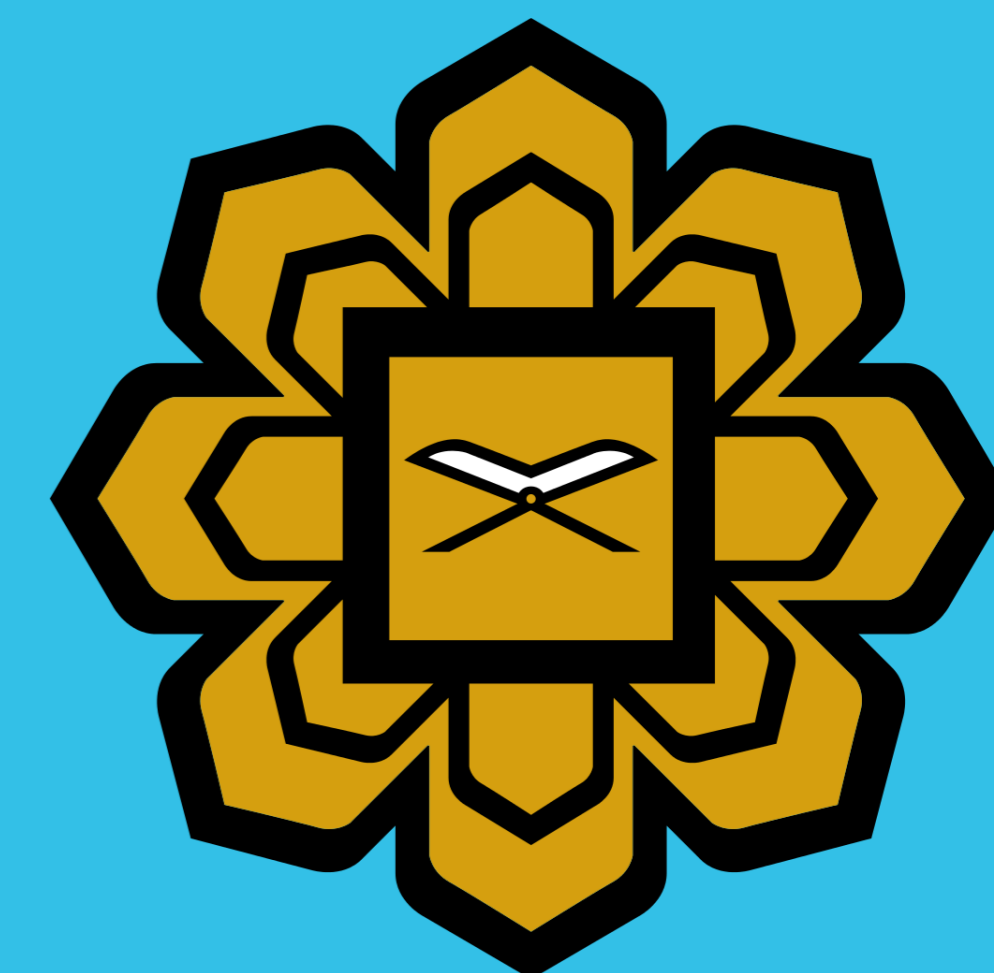


ROLE OF GRADIENT ECHO SEQUENCE IN DELINEATION OF THENAR MUSCLES ANATOMY

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Introduction :

Magnetic Resonance Imaging (MRI) is known to be the imaging modality of choice to assess human muscles anatomy superior to other modalities (eg: ultrasound and CT scan) due to its excellent ability to differentiate soft tissue contrast, good spatial resolution and wider field of view with no radiation effect. To date, proton Density (PD), T1W and T2W sequences are been utilised to assess muscular structures. However, delineation of each thenar muscle which are small in size can be difficult using these sequences.

Keywords : Magnetic Resonance Imaging, Gradient Echo Sequence, Muscle, Thumb, Hand

Objectives :

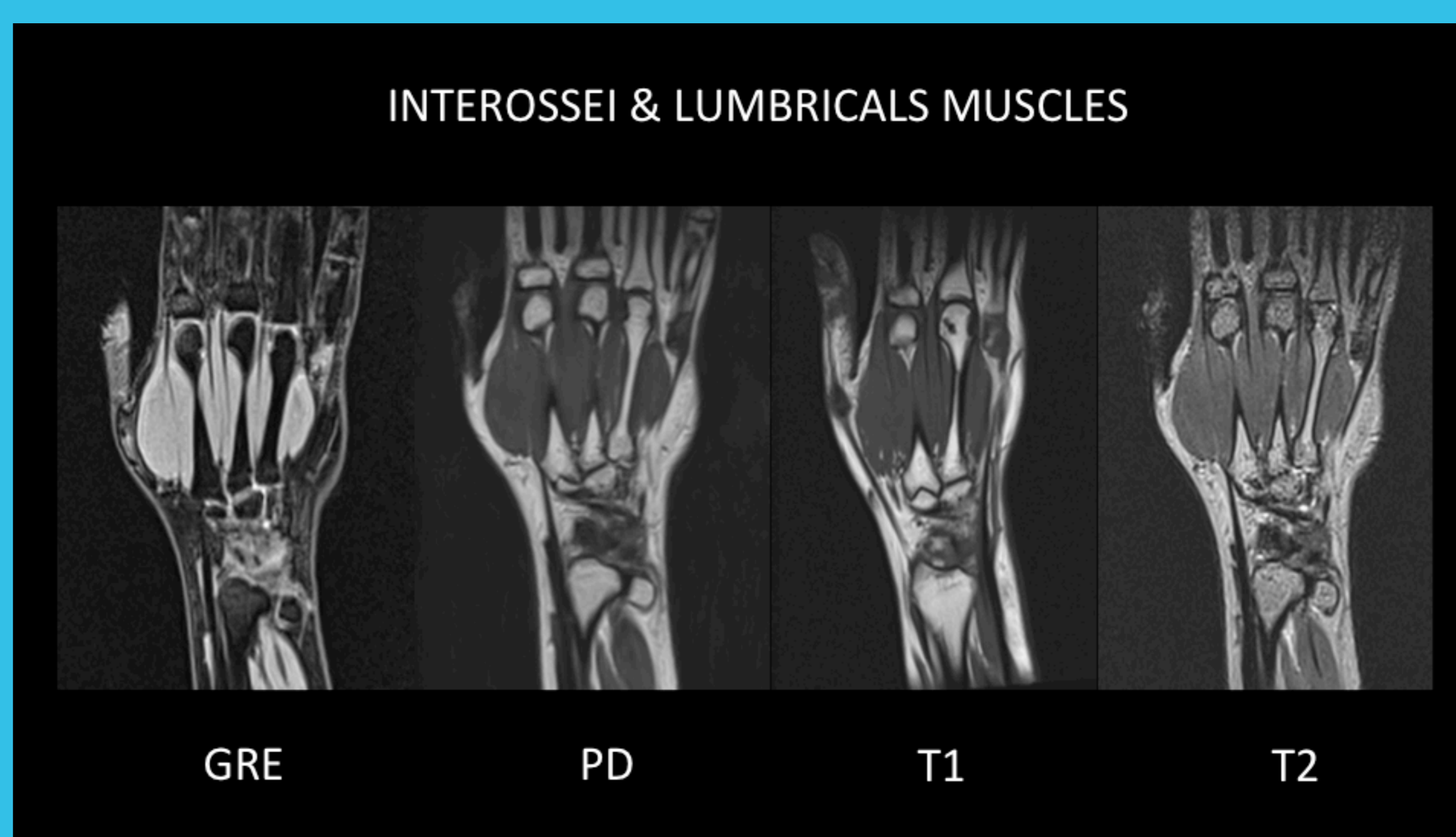
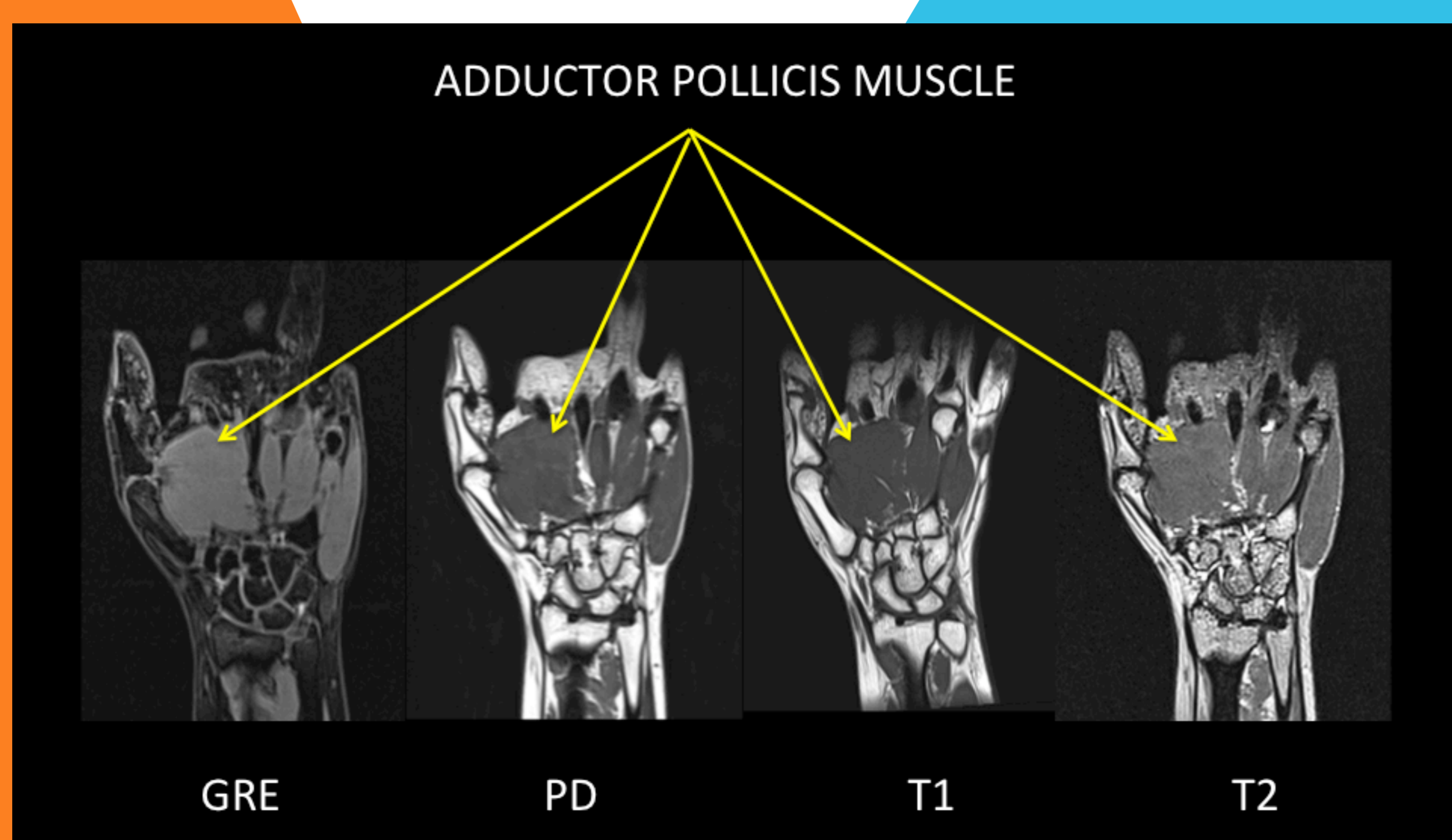
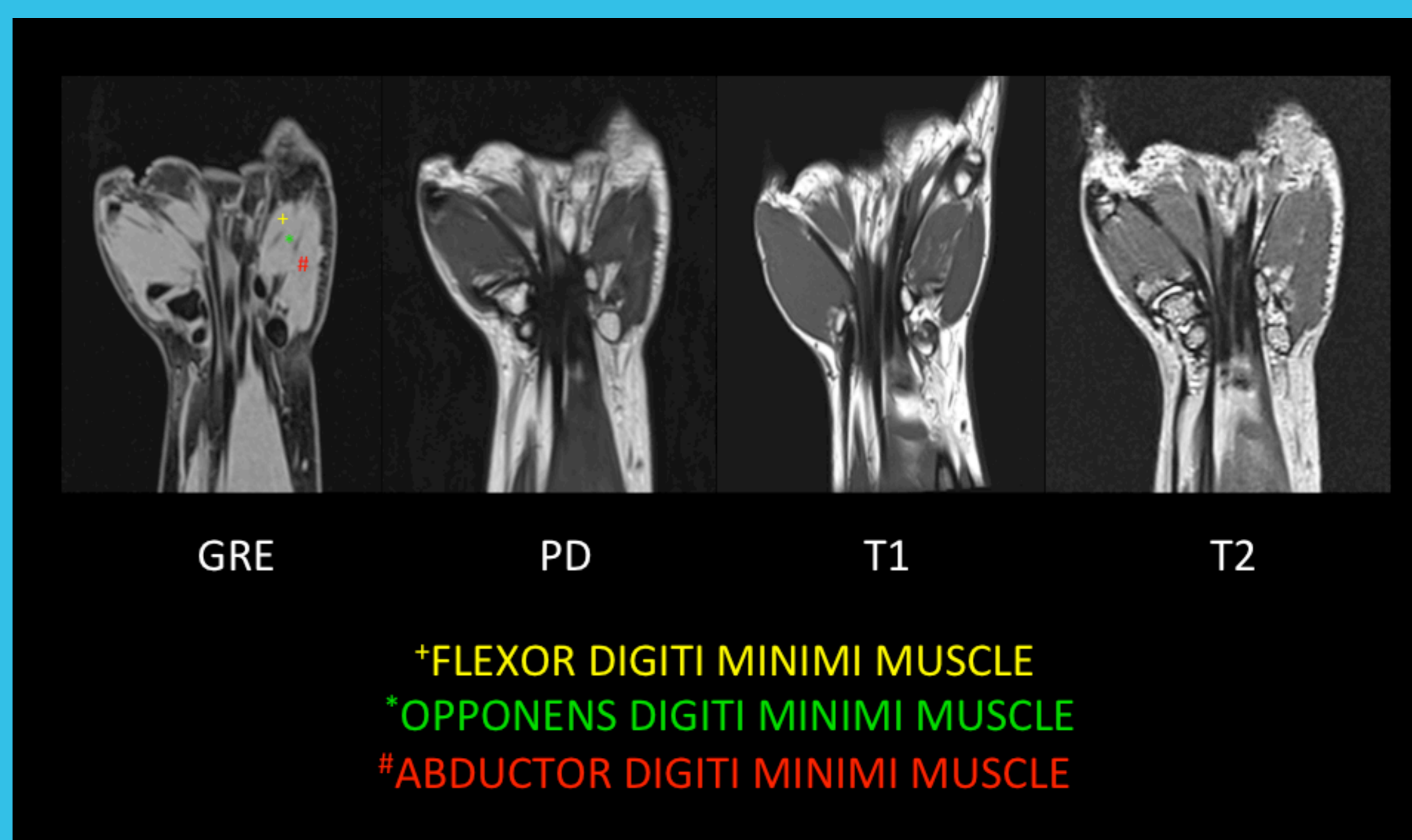
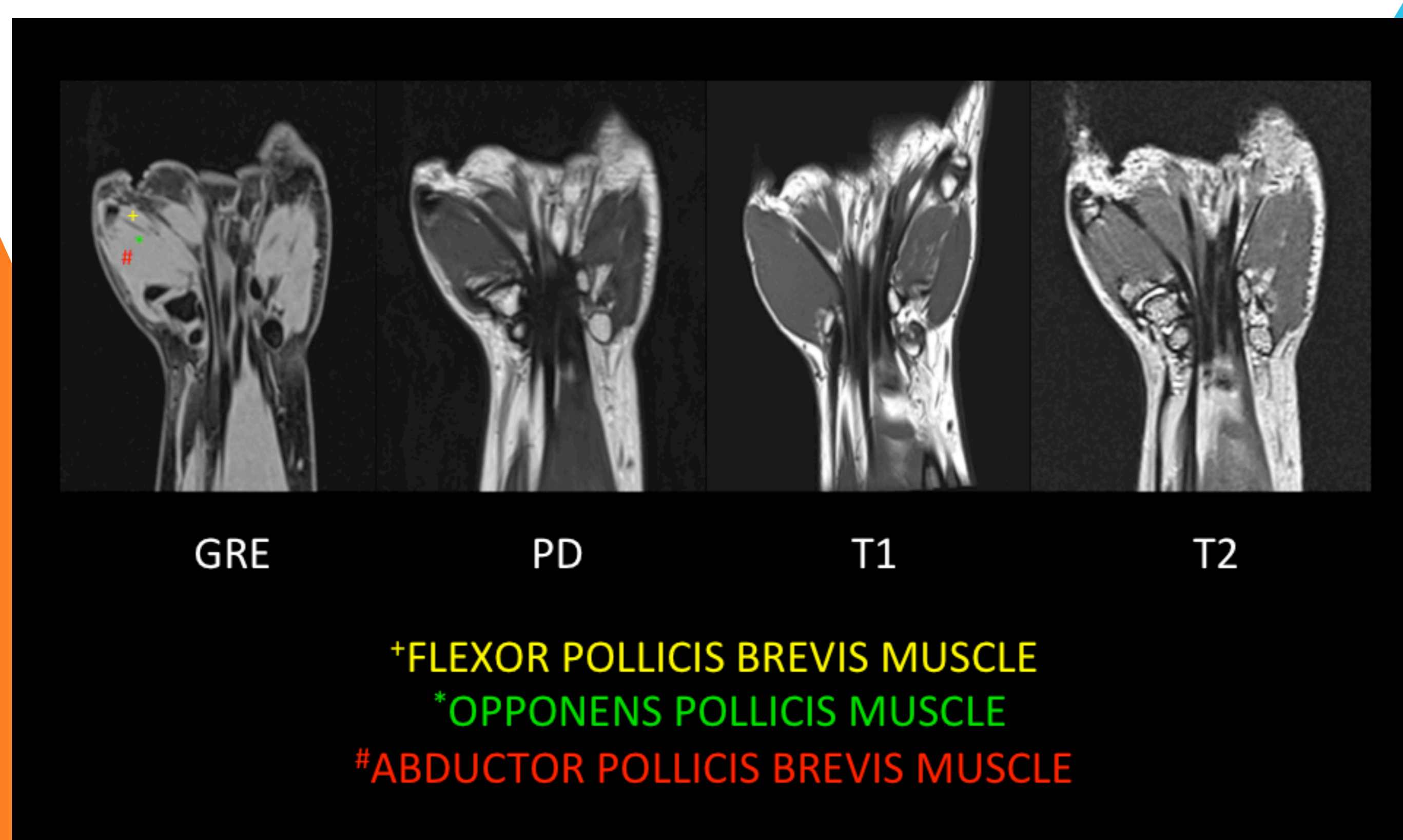
In this case study, we utilised gradient echo (GRE) sequence i.e. DESS sequence to delineate each thenar muscle of the hand of a healthy male subject and comparison was made between PD, T1W and T2W sequence images.

Methods :

Magnetic resonance imaging was performed using a MAGNETOM Aera 1.5 Tesla scanner (Siemens Healthineers, USA). The imaging protocol included coronal three dimensional Double Echo Steady State (DESS 3D), PD, T1W and T2W, each with reconstruction of axial and sagittal views. Each acquisition sequence was performed for each full abduction and adduction of the thumb of the right hand. The thenar muscles observed were adductor pollicis, flexor pollicis brevis, abductor pollicis brevis and opponens pollicis muscles.

Results :

We found that thenar muscles anatomy can be better delineated and differentiated using GRE (DESS) sequence. Other small muscles of the hand such as hypothenar, interossei and lumbricals muscles were also better delineated using this sequence. Although GRE sequence had slightly longer acquisition time, it was also more useful to assess cartilage of joints of the hand compared to other sequences.



Conclusions :

Gradient echo sequence plays an important role in delineation of thenar muscles anatomy as well as other small muscles of the hand. It is also useful to assess cartilage of joints of the hand.

References :

1. Horowitz AL. MRI Physics for Physicians. Springer Science & Business Media. (1989) ISBN:1468403338.
2. Mangrum W, Christianson K, Duncan S et-al. Duke Review of MRI Principles. Mosby. (2012) ISBN:1455700843.

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	GRE	PD	T1	T2
TR (ms)	20	1300	400	3200
TE (ms)	7.5	41	11	381
FOV (mm)	220	220	220	250
Matrix	197 x 256	175 x 256	256 x 320	204 x 256
Slice thickness (mm)	0.7	0.9	2.0	0.9
Voxel size (mm)	0.9 x 0.9 x 0.7	0.9 x 0.9 x 0.9	0.7 x 0.7 x 2.0	1.0 x 1.0 x 0.9
TA (min)	5:39	4:20	3:56	3:42