

# Dissociation of lower limb muscle growth in young children with unilateral cerebral palsy

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## Background

- Research on muscle development in children with unilateral cerebral palsy (UCP) has focused on muscles of the more-involved limb, and those prone to spasticity and contracture<sup>[1][2]</sup>.
- Few studies report muscle development of agonist-antagonist muscle pairs.

## Aim

- To identify the relationship of growth between the tibialis anterior (TA) muscle and medial gastrocnemius (MG) muscle in UCP and typically developing (TD) children

## Methods

- 3D-US of the MG and the TA muscle in the more-impaired (UCMI) and the less-impaired (UCLI) of twenty children with UCP [age  $6 \pm 2.7$ , GMFCS I=12, II=8] and the left limb in twenty TD children age  $6.2 \pm 2.2$ ].
- Linear mixed models were used to investigate the effect of group on volume, mean EI and the ratio of MG to TA (MG:TA) volume. The age-by-group interaction was used to determine whether the rate of change in muscle volume with respect to age was different between groups.

## Results

- MG of the UCMI was smaller and had a higher mean EI compared to UCLI and TD. There was no difference in TA volume or EI between any groups.
- Compared to TD, MG:TA volume of UCLI & UCMI was smaller and there was a significant age-by-group interaction for UCMI but not for TD.

Table 1. Group data for muscle volume and echo-intensity

	TD Mean (SD)	USCP-LI Mean (SD)	USCP-MI Mean (SD)
MG volume (ml/kg)	1.94 (0.40)	1.85** (0.42)	1.36* (0.52)
MG EI (au)	106 (5.2)	110** (16.0)	120* (17.2)
TA volume (ml/kg)	2.18 (0.60)	2.41 (0.53)	2.04 (0.73)
TA EI (au)	99 (10.5)	101 (20.0)	111 (23.4)
MG-TA volume	0.94 (0.25)	0.79* (0.16)	0.67* (0.19)

\* Significantly different ( $p < 0.05$ ) to TD; \*\* Significantly different ( $p < 0.05$ ) to USCP-MI

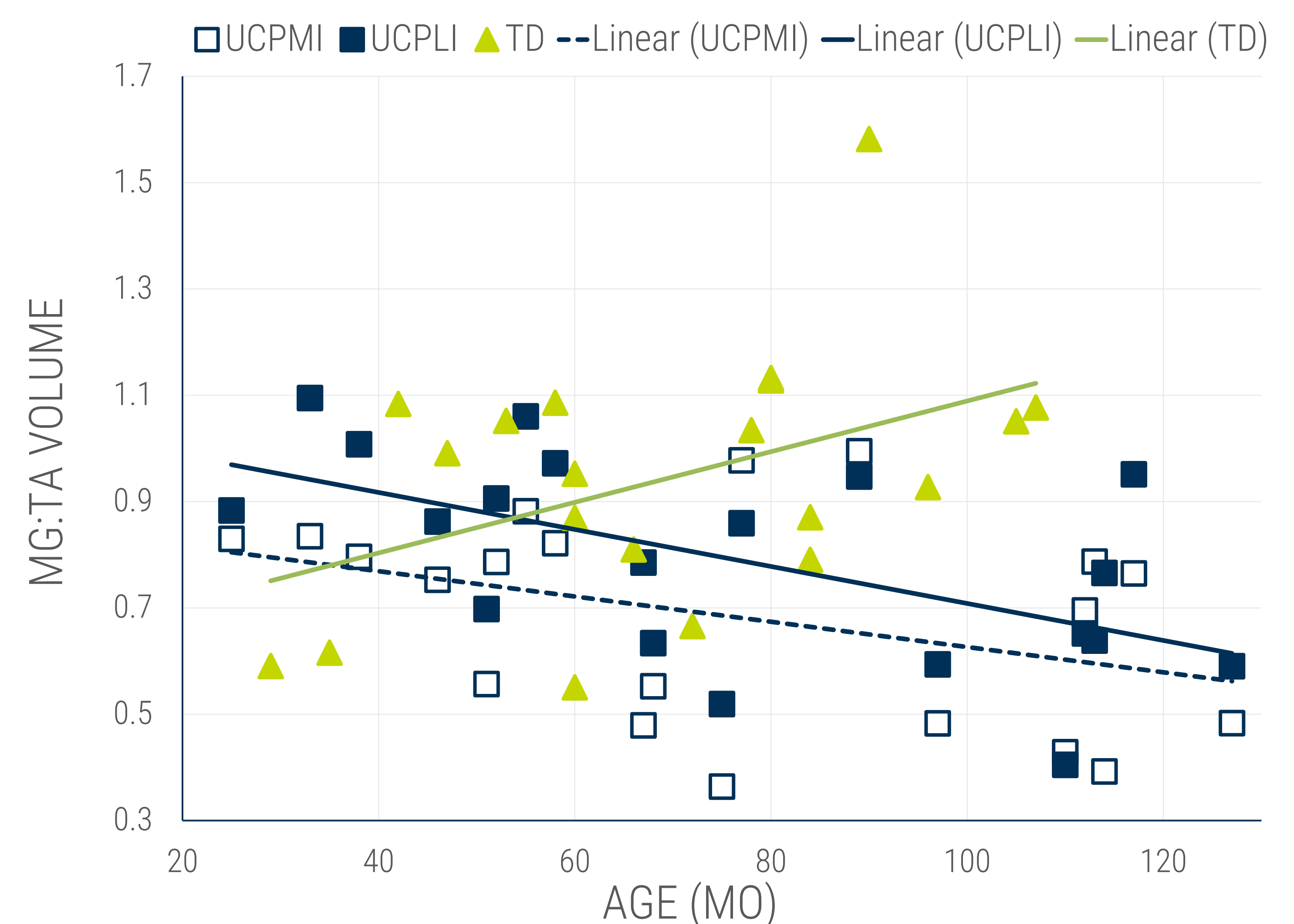


Figure 2. Ratio of MG to TA muscle volume as a function of age

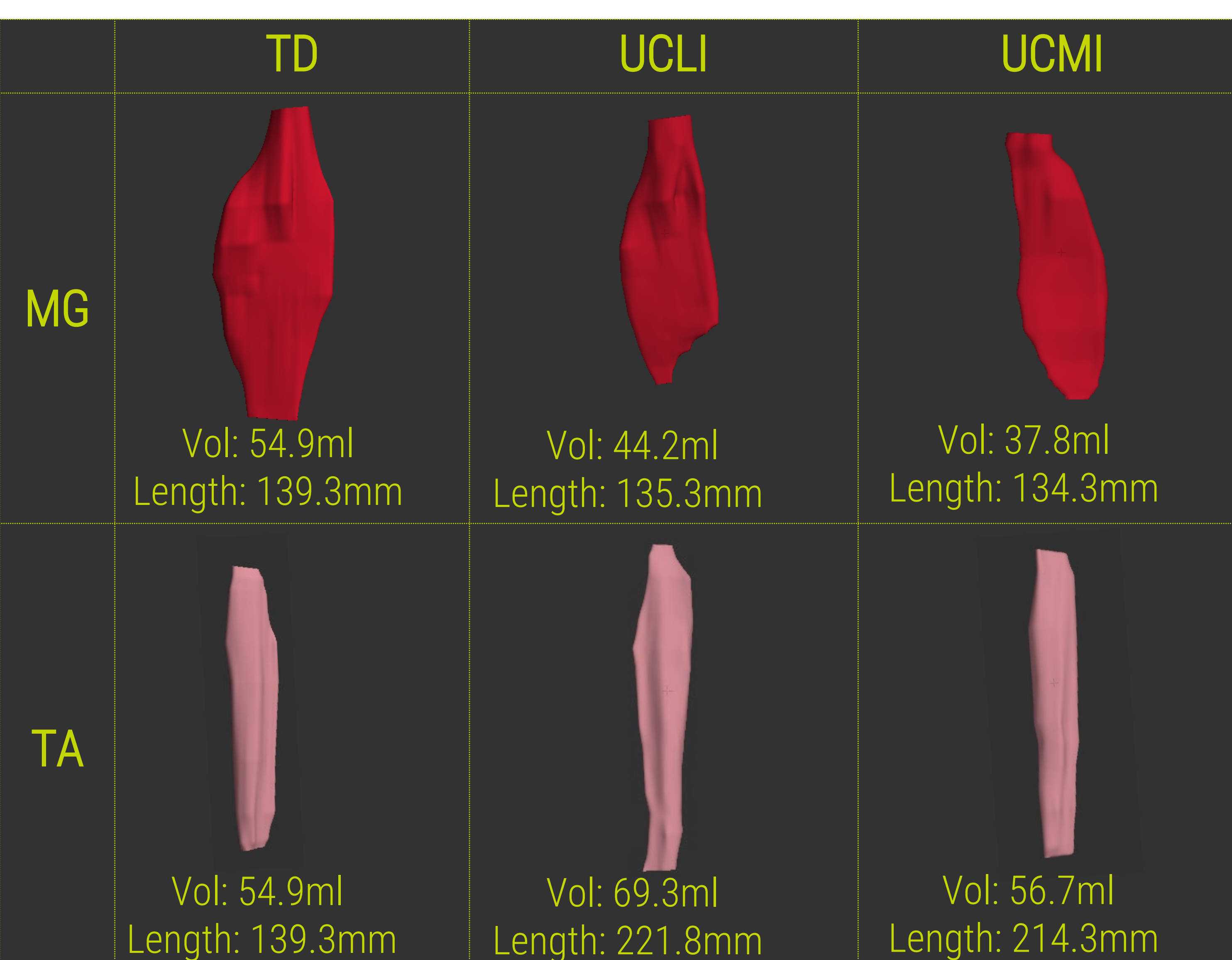


Figure 1. 3D muscle representation MG, TA for all groups

## Conclusion

The ratio of MG to TA volume is preserved in early childhood in TD children but children with UCP show an age-related decline in both limbs that is driven by both slower growth of the MG, and faster growth of the TA muscle.

## References

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