Elena Leonardi

Dietitian, PhD student

Università Cattolica Del Sacro Cuore, Rome

LONGITUDINAL CT-BASED SKELETAL MUSCLE MONITORING:

EVALUATING THE THIGH MUSCLES AS A RELIABLE PROXY FOR ABDOMINAL MUSCLES METRICS

E. Leonardi, P. Raoul, C. De Rossi, M. Palombaro, E. Rinninella, M. Di Virgilio, F. Ferracci, F. Grassi, A. Gasbarrini, M.C. Mele, M. Cintoni

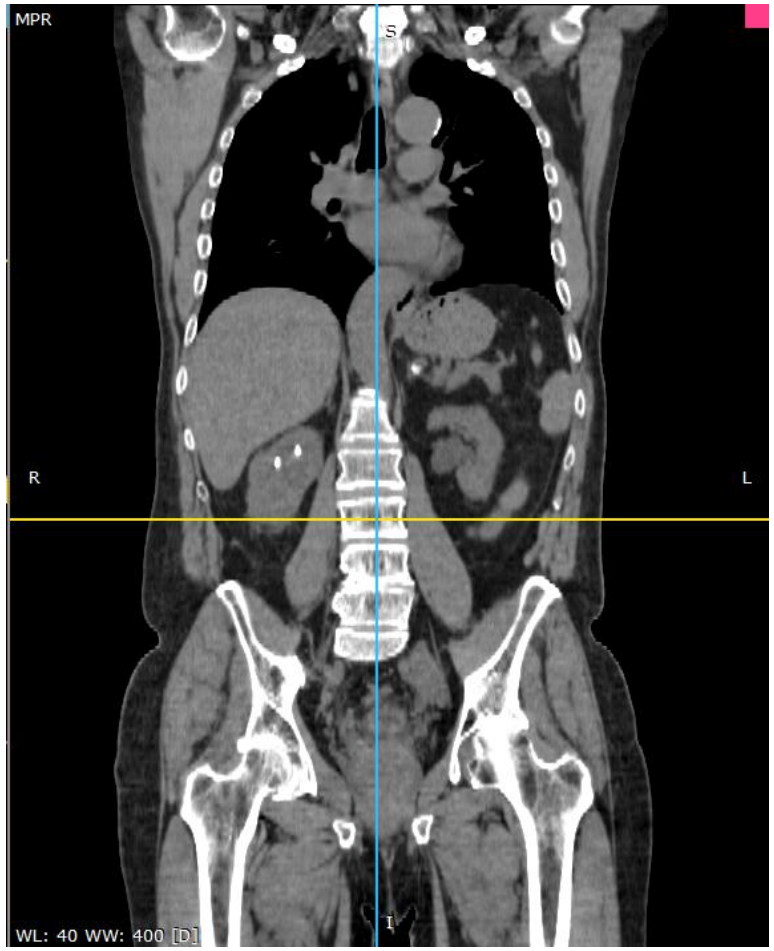
27 - 29 novembre 2025

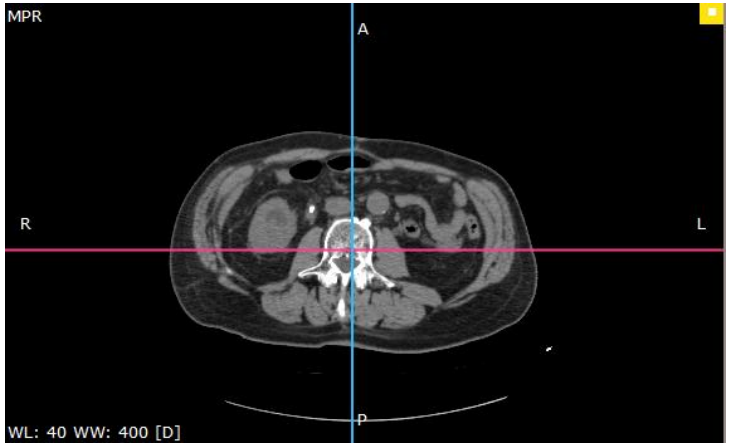
Padova Congress
Via Carlo Goldoni 8, Cancello C – Padova

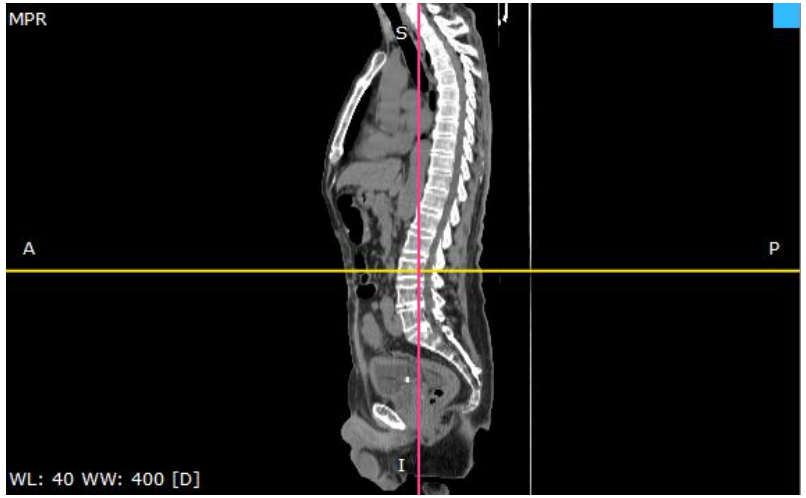
SKELETAL MUSCLE MASS ASSESSMENT - CT

GOLD STANDARD

Third lumbar vertebra (L3)





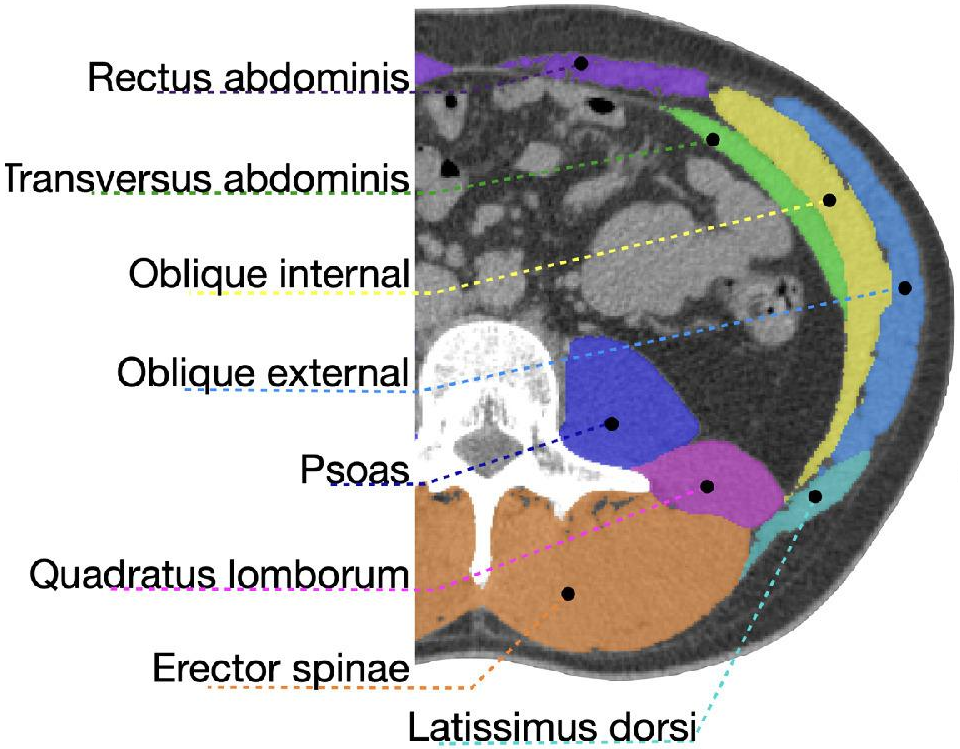


SKELETAL MUSCLE MASS ASSESSMENT - CT

Third lumbar vertebra (L3)

Total muscle area (SMA)

The sum of the muscle areas of all the muscles



de Medeiros, Galtieri Otávio Cunha et al. "Comparative assessment of abdominal and thigh muscle characteristics using CT-derived images." *Nutrition* vol. 99-100 (2022): 111654

SKELETAL MUSCLE MASS ASSESSMENT - CT

IS IT THE ONLY SITE THAT CAN BE USED IN LONGITUDINAL MONITORING OF SKELETAL MUSCLE CHANGES?

ASCITES

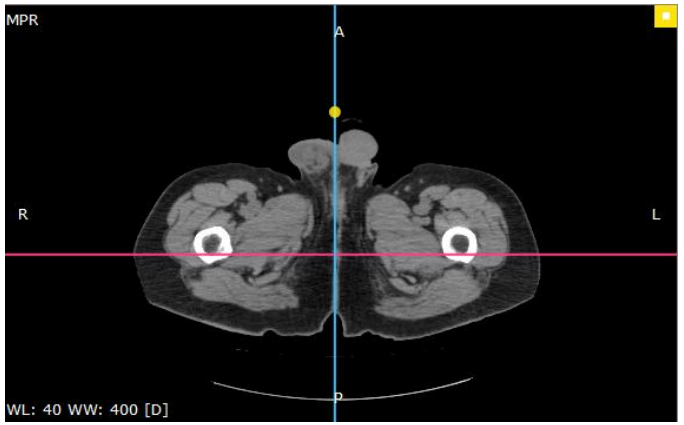
COLONSTOMY

ANATOMIC ALTERATIONS

……

OBJECTIVES

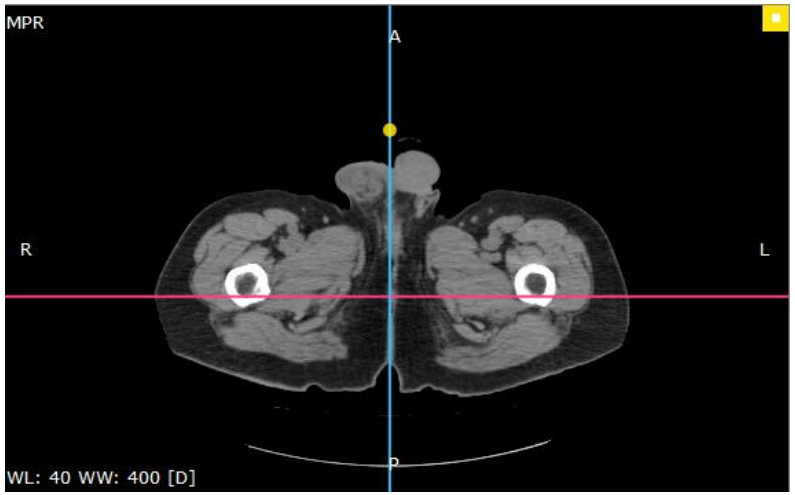
Evaluate the **reliability of thigh muscle metrics** as a **practical proxy** for traditional abdominal muscle metrics

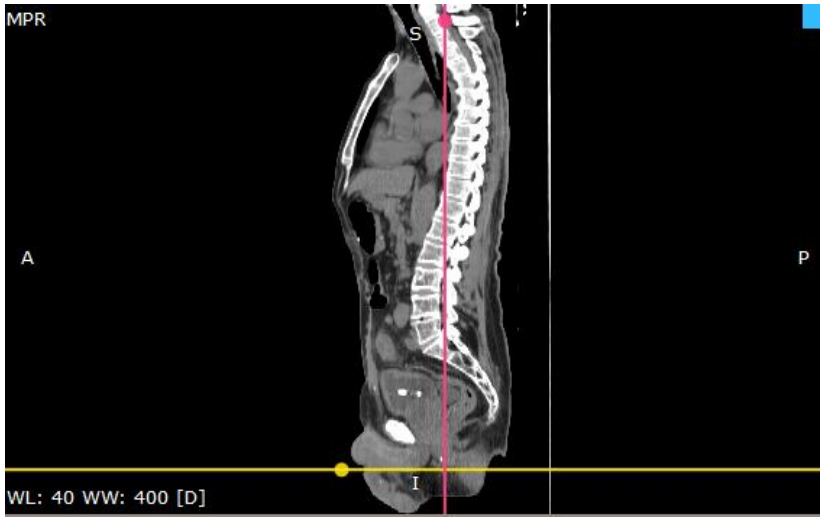


Focusing on the **Longitudinal Monitoring** of SMM variations.

NEW LANDMARK – THE UPPER THIGH

Lower margin of the lesser trochanter



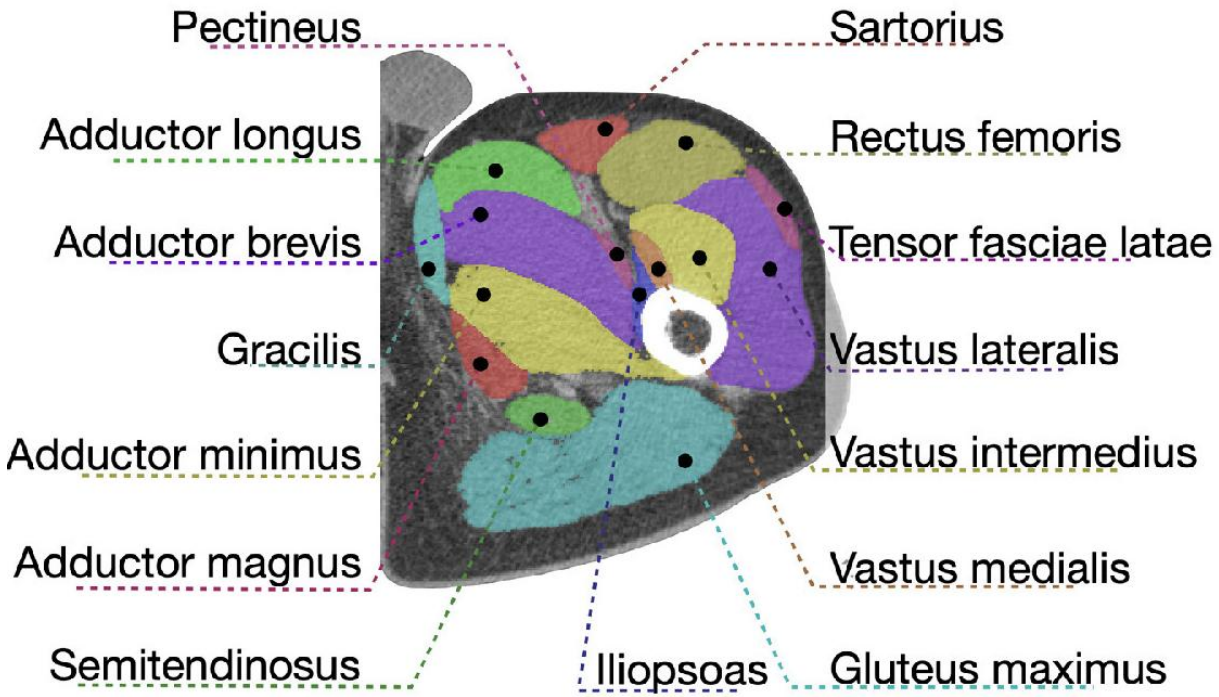


UPPER THIGH LANDMARK

Lower margin of the lesser trochanter

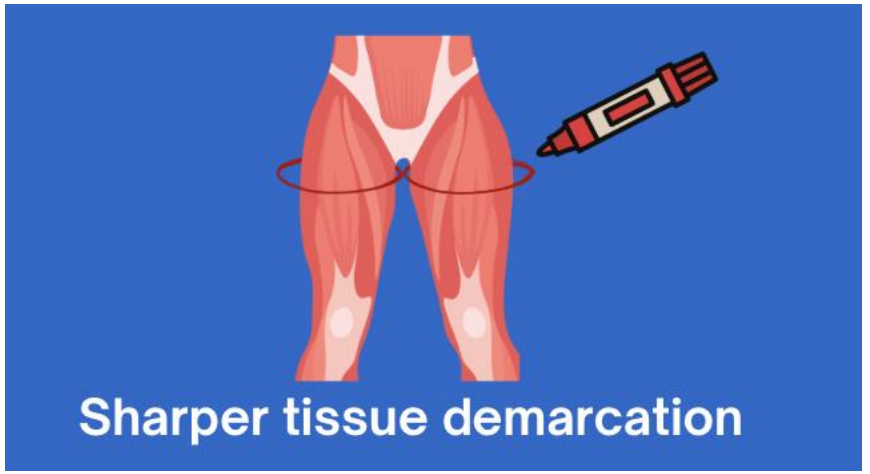
Total muscle area (SMA)

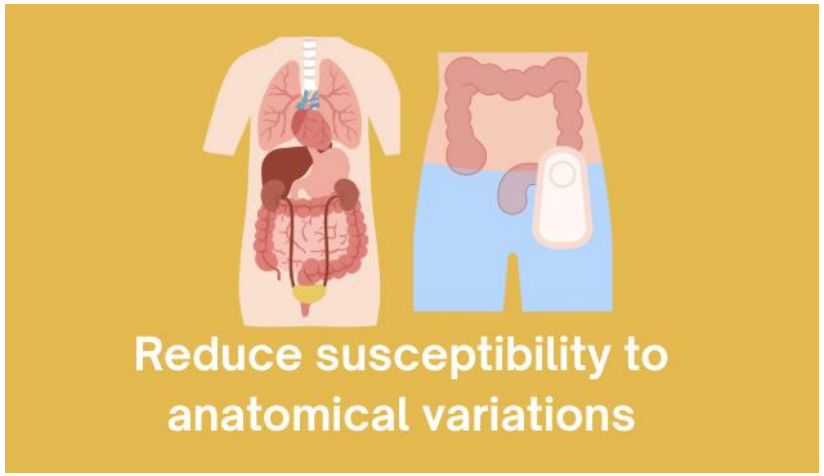
The sum of the muscle areas of both legs



de Medeiros, Galtieri Otávio Cunha et al. "Comparative assessment of abdominal and thigh muscle characteristics using CT-derived images." *Nutrition* vol. 99-100 (2022): 111654

ADVANTAGES OF USING THE UPPER THIGHT LANDMARK





RETROSPECTIVE ANALYSIS

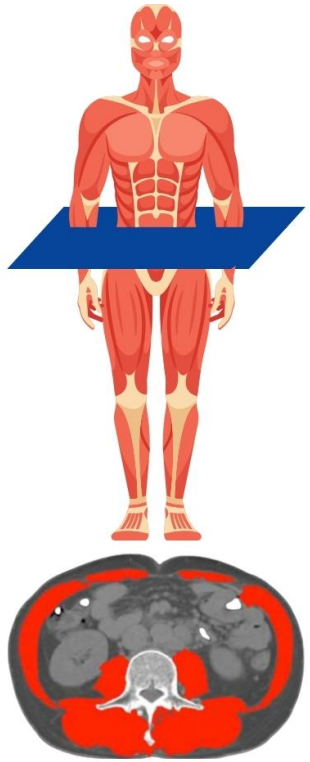
92 patients

Peritoneal Surgery Unit

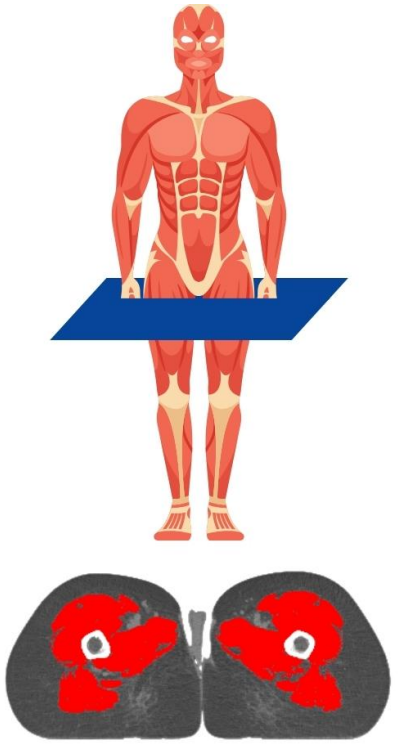
2 CT SCANS

T0 T1

3 to 6 months



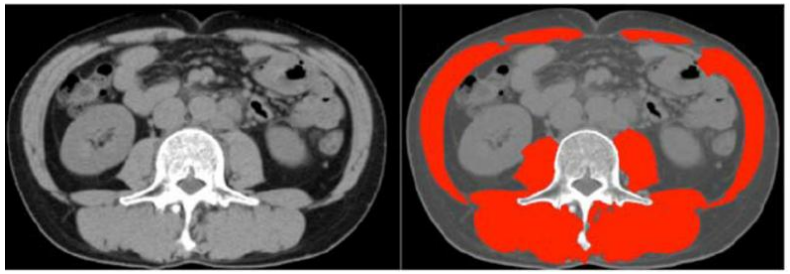
L3 Level



Upper Thigh Level

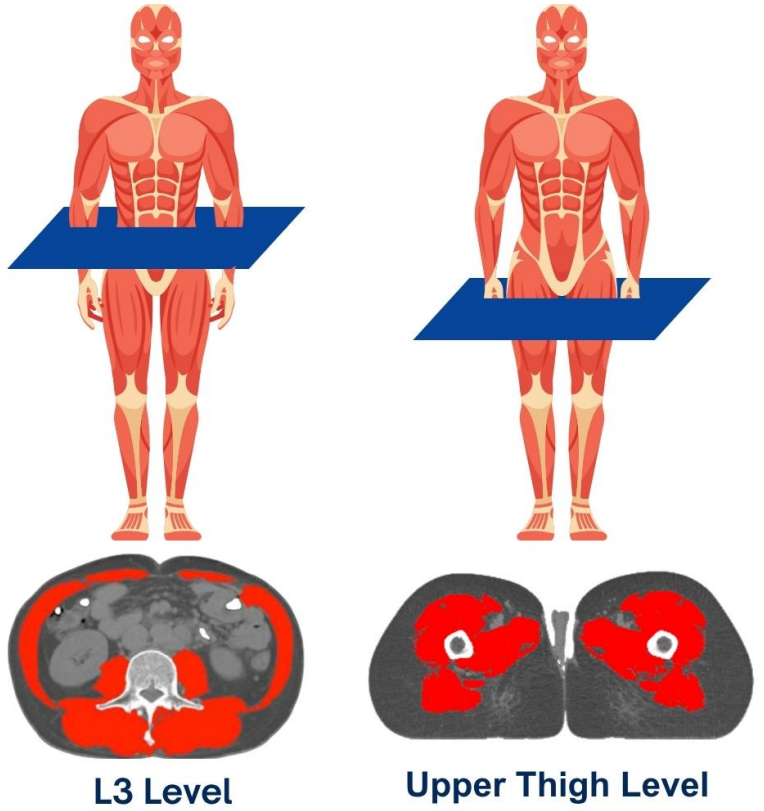
SMM ANALYSIS

- Skeletal Muscle Area
- Skeletal Muscle Index
- Skeletal Muscle Density



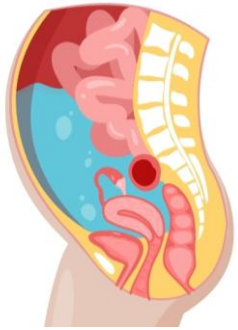
TomoVision

sliceOmatic 6



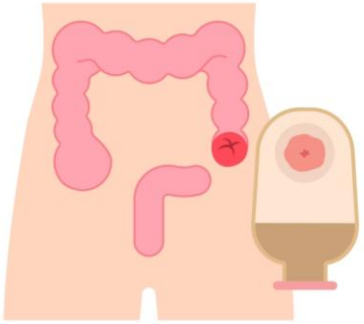
EXCLUSION CRITERIA

Presence of ascites



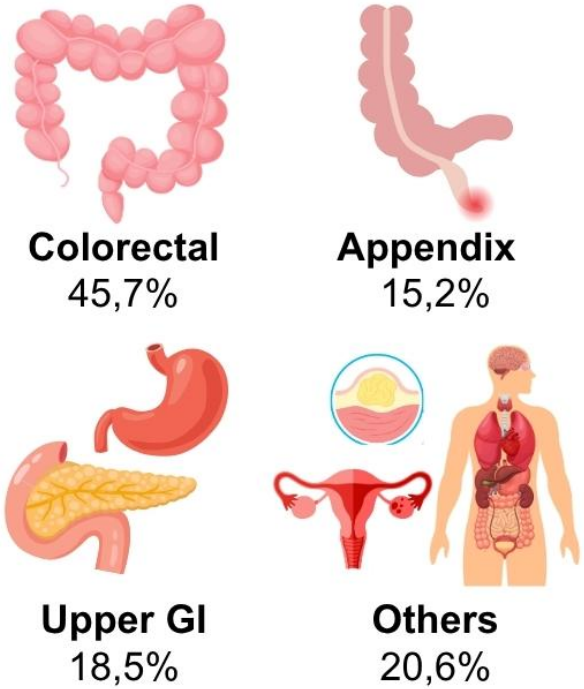
Significant subcutaneous edema

Anatomical variations that could impede accurate CT image analysis



BASELINE DATA

PRIMARY TUMOUR



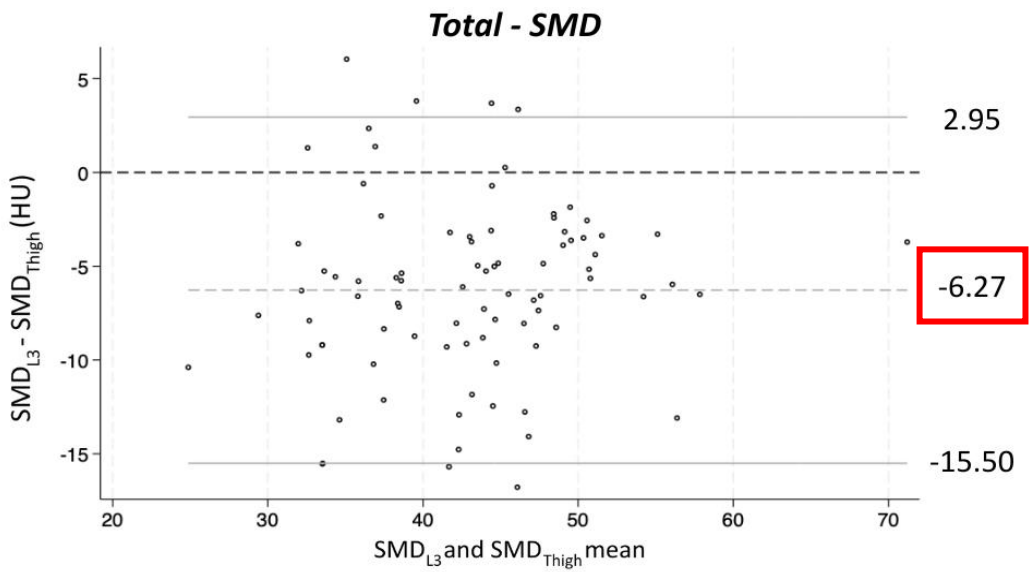
	Total (N = 92)	Men (N = 42)	Women (N = 50)	P-value
Age (y)	61.8±12.3	58.1±13.6	65.7±9.3	0.004
Weight (kg)	71.9±12.6	80.6±10.6	63.6±7.8	<0.00001
Height (m)	1.67±0.09	1.74±0.06	1.61±0.07	<0.00001
BMI	25.6±3.2	26.7±3.2	24.6±2.7	0.001

SMA and SMI CORRELATION T0 AND T1

A **strong correlation** was observed for SMA and SMI between the two sites

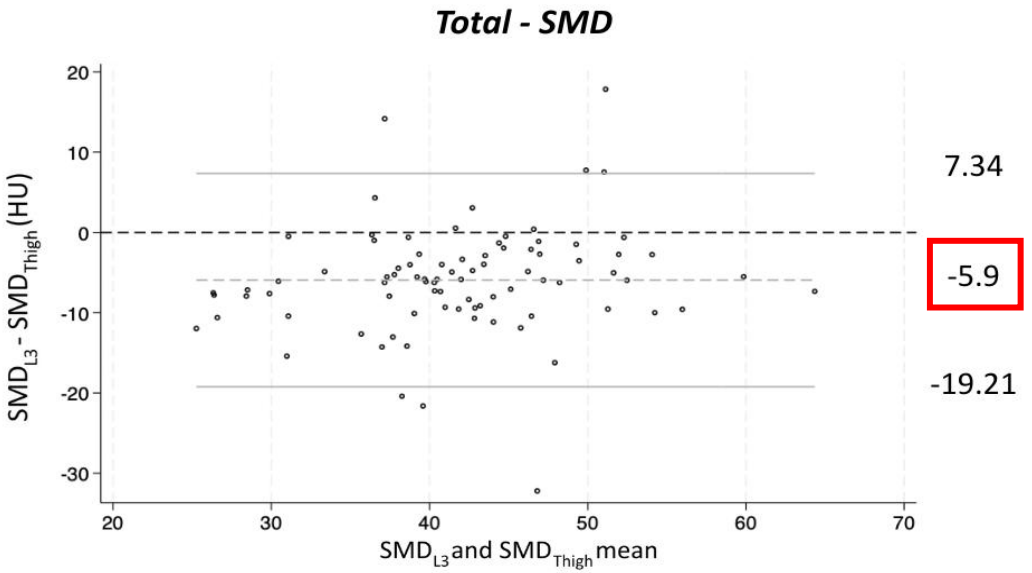
	T0		T1	
	Pearson	P - value	Pearson	P - value
Total				
SMA (cm^2)	0.89	<0.00001	0.91	<0.00001
SMI (cm^2/ m^2)	0.79	<0.00001	0.83	<0.00001
Females				
SMA (cm^2)	0.72	<0.00001	0.85	<0.00001
SMI (cm^2/ m^2)	0.64	<0.00001	0.66	<0.00001
Males				
SMA (cm^2)	0.79	<0.00001	0.70	<0.00001
SMI (cm^2/ m^2)	0.73	<0.00001	0.81	<0.00001
18-65 y				
SMA (cm^2)	0.92	<0.00001	0.92	<0.00001
SMI (cm^2/ m^2)	0.83	<0.00001	0.82	<0.00001
≥ 65 y				
SMA (cm^2)	0.85	<0.00001	0.91	<0.00001
SMI (cm^2/ m^2)	0.76	<0.00001	0.83	<0.00001

BLAND ALTMAN SMD - T0 e T1



Weak agreement at T0

Mean difference: **-6.27 HU**; LOA –15.50; 2.95



Weak agreement at T1

Mean difference: **-5.9 HU**; LOA -19.21; 7.34

SMD

Contents lists available at ScienceDirect

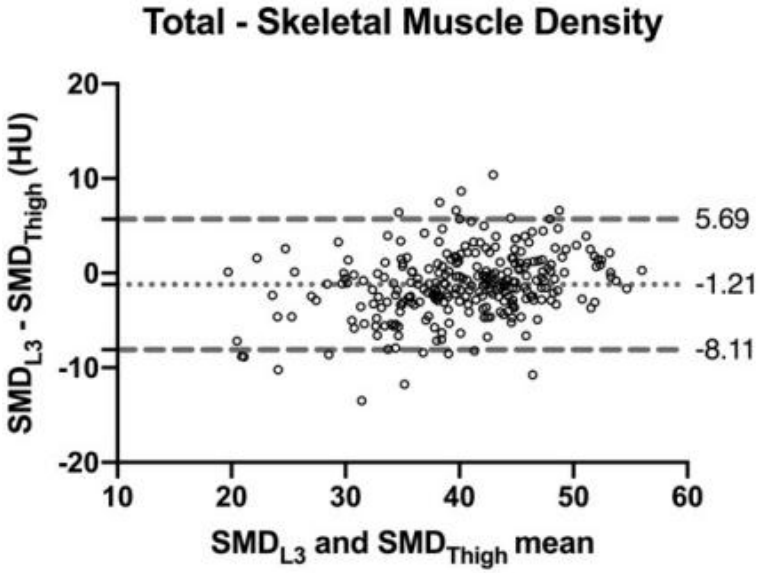
Nutrition

journal homepage: www.nutritionjrnl.com

Applied nutritional investigation

Comparative assessment of abdominal and thigh muscle characteristics using CT-derived images

Galtieri Otávio Cunha de Medeiros [a], Iasmin Matias de Sousa [a], Gabriela Villaça Chaves [b], Maria Cristina Gonzalez [c], Carla M Prado [d], Ana Paula Trussardi Fayh [a,e,f,*]



ΔSMA and ΔSMI CORRELATION T0 AND T1

The longitudinal assessment of changes in SMM over time

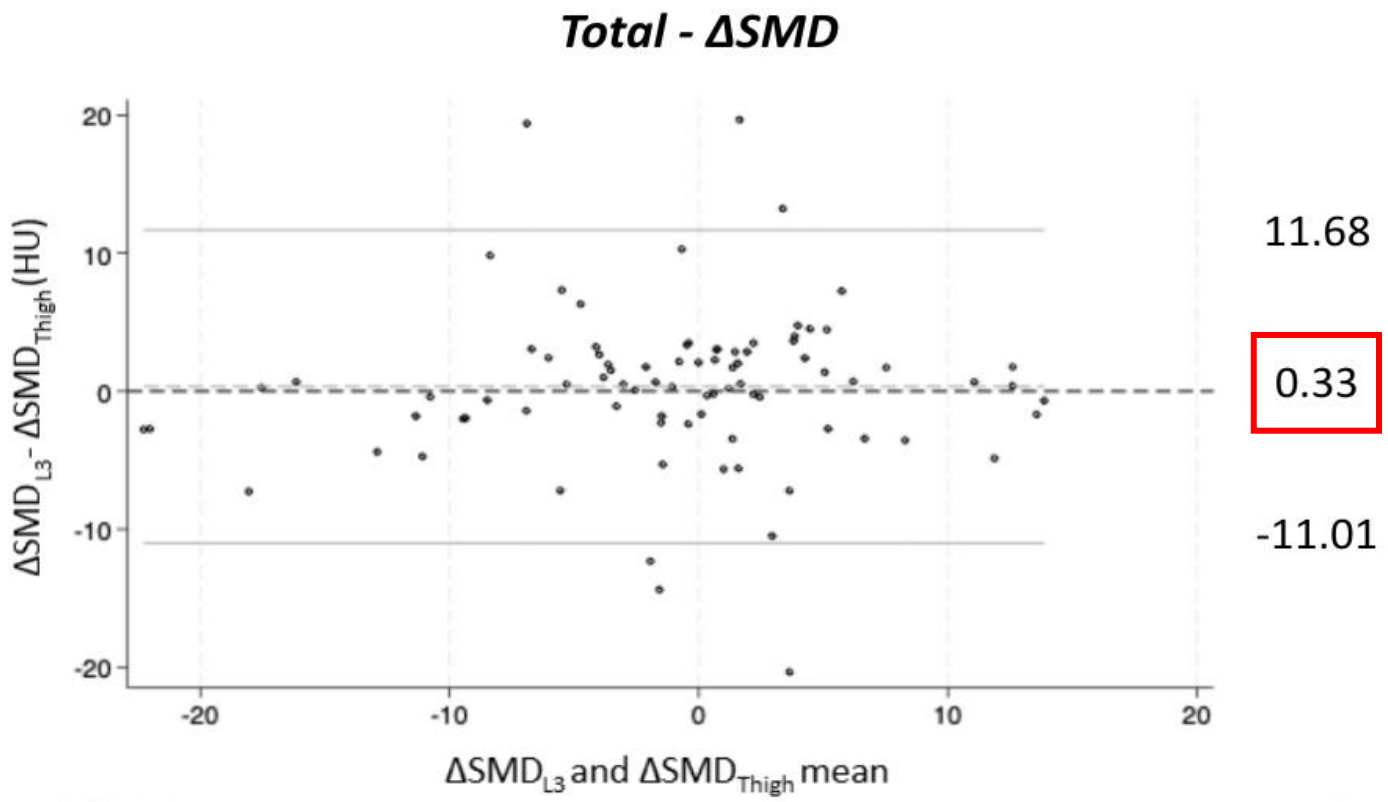
	Pearson	Interpretation	P - value
Total			
SMA (cm^2)	0.61	Moderate	<0.00001
SMI (cm^2/ m^2)	0.62	Moderate	<0.00001
Females			
SMA (cm^2)	0.76	Strong	<0.00001
SMI (cm^2/ m^2)	0.74	Strong	<0.00001
Males			
SMA (cm^2)	0.54	Moderate	0.0002
SMI (cm^2/ m^2)	0.57	Moderate	0.0001
18-65 y			
SMA (cm^2)	0.76	Strong	<0.00001
SMI (cm^2/ m^2)	0.75	Strong	<0.00001
≥ 65 y			
SMA (cm^2)	0.45	Moderate	0.004
SMI (cm^2/ m^2)	0.52	Moderate	<0.00001

Moderate correlation in SMA (Δ_{SMA}) and SMI (Δ_{SMI})

Moderate correlation in males and the ≥ 65 years group

Strong correlation in females and the 18-65 years group

BLAND ALTMAN ΔSMD



Consistent Agreement between the sites

Mean difference: **0.33 HU**; LOA - -11.0;11.6

CONCLUSIONS

Thigh-level CT scans present a promising alternative site to traditional muscle mass assessment at the L3 level

FUTURE PROSPECTIVE

- Larger cohorts
- More heterogeneous populations and cancer types

Grazie per l’attenzione

Elena Leonardi

Dietitian, PhD student

Università Cattolica Del Sacro Cuore, Rome

LONGITUDINAL CT-BASED SKELETAL MUSCLE MONITORING:

EVALUATING THE THIGH MUSCLES AS A RELIABLE PROXY FOR ABDOMINAL MUSCLES METRICS

E. Leonardi, P. Raoul, C. De Rossi, M. Palombaro, E. Rinninella, M. Di Virgilio, F. Ferracci, F. Grassi, A. Gasbarrini, M.C. Mele, M. Cintoni

27 - 29 novembre 2025

Padova Congress
Via Carlo Goldoni 8, Cancello C – Padova