



Frailty, Sarcopenia, Osteoporosis

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Sarcopenia and Osteoporosis

Patients diagnosed with sarcopenia and osteoporosis are at risk of adverse health outcomes

- FRACTURES
- REDUCED MOBILITY
- MORTALITY



Osteo-Sarcopenia

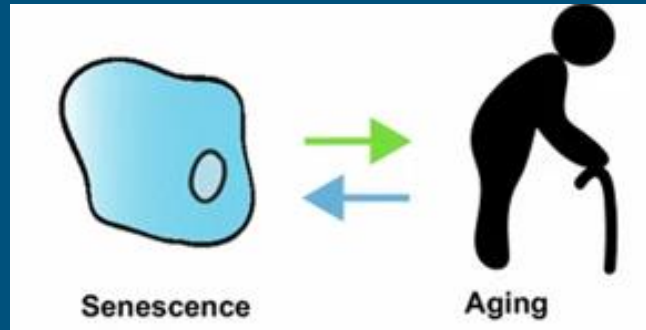
CAPTURES THE CONCEPT OF FRAILTY

- Independent of:
 - Ethnicity
 - Age
 - Morbidity
 - Obesity
 - Income



Cellular Senescence

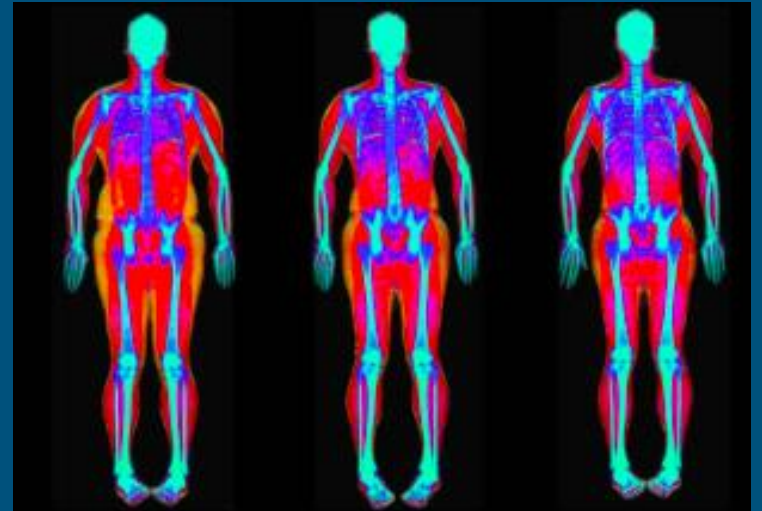
Is implicated in age related phenotypes with removal of senescent cells that can PREVENT or DELAY tissue dysfunction



SARCOS STUDY (Brazil)

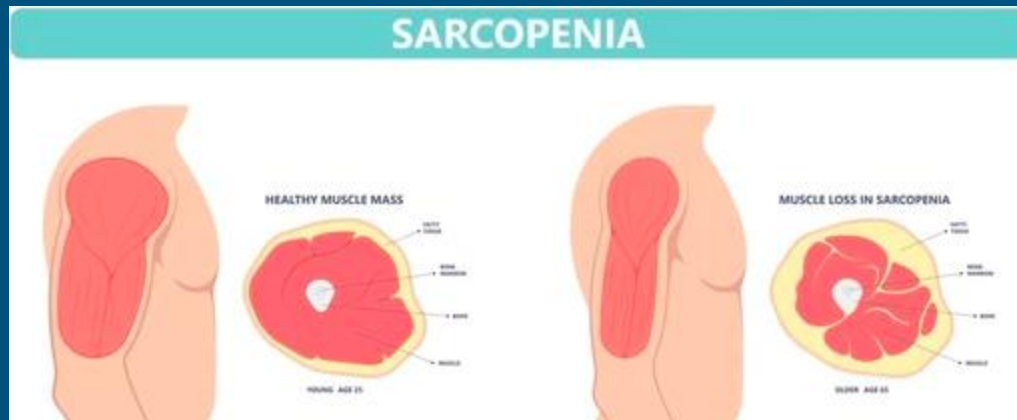
Showed association between LEAN BODY MASS and OSTEOPOROSIS

A. Frisoli et al, E J Clin Nutrition 1.3.21



Frailty and Sarcopenia

- FRAILITY Encompasses overall physiological reserves
- SARCOPENIA focuses on muscle
- FRAILITY IS associated with sarcopenia
- BOTH conditions contribute to a loss of physiological reserves in the locomotor system with age

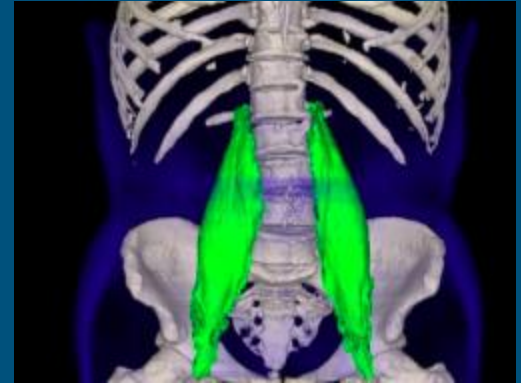


Sarcopenia

Measured by normalised TOTAL PSOAS AREA (NTPA)

Can predict:

- Mortality
- Adverse events (AE)



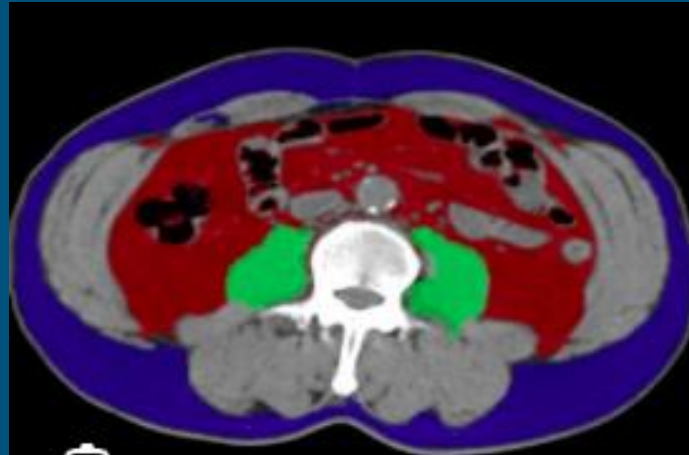
TOTAL PSOAS AREA (TPA)

The mid L3 level

On pre- Operative CT

Adjusted for height (NTPA)

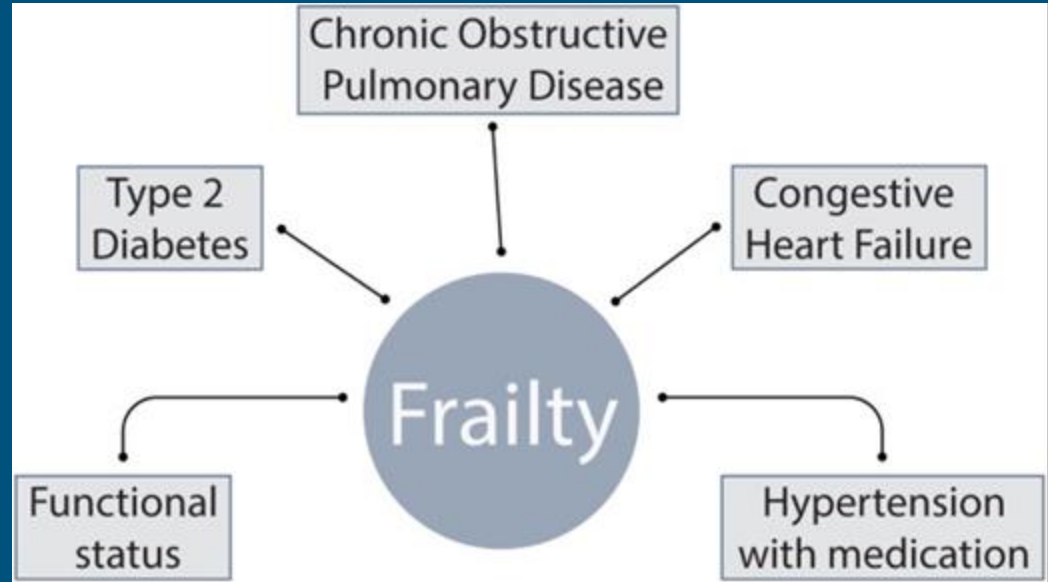
Defined Sarcopenia



Modified Frailty Index (MFI)

Can offset:

- Perioperative morbidity
- Adverse events (AEs)
- Length of stay
- Discharge disposition (to care facility)
- Mortality





5-factor modified Frailty Index predicts adverse outcomes after elective Anterior Lumbar Interbody Fusion



Background:

The 5-factor modified frailty index (mFI-5) shown to be effective for predicting adverse events after various spine procedures
Utility in anterior lumbar interbody fusion (ALIF) not well established



Methods:

Retrospective, 2010-2019 National Surgical Quality Improvement Program (NSQIP) database

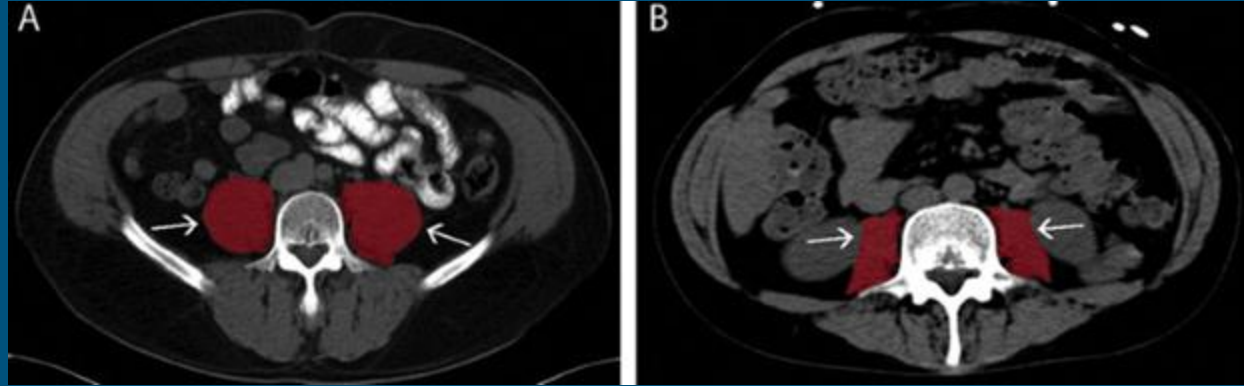
- 11,711 elective ALIF patients
- Associations between mFI-5 and 30-day complications, readmissions, reoperations and mortality assessed

Results:

The mFI-5 is an independent predictor for 30-day postoperative complications, readmissions, UTI, pneumonia, and unplanned intubations following elective ALIF surgery in adults over the age of 50



NTPA (adjusted for height)



NTPA is independent of:

- Patients gender
- BMI

But did not necessarily predict acute care complications in elderly patients having lumbar spine surgery

Sarcopenia

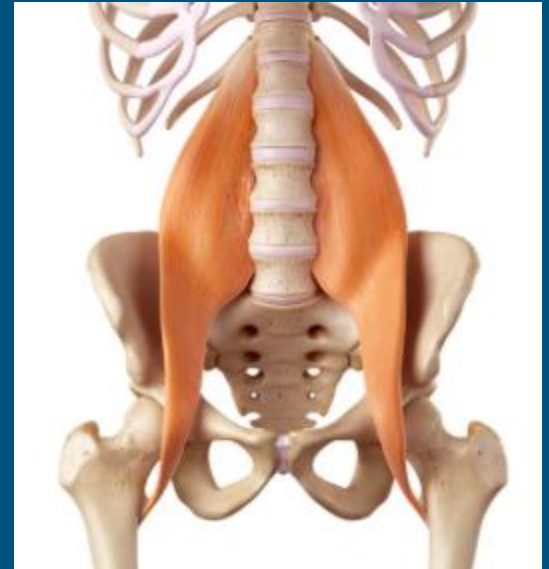
Defined as a progressive loss of skeletal muscle mass, strength and power associated with adverse outcomes.

It is a manifestation of musculoskeletal frailty



PSOAS muscle size

Used as a measure of sarcopenia and shown to predict perioperative outcomes and mortality following major abdominal surgery



Frailty

A state of increased vulnerability due to poor resolution of homeostasis after a stressor event

Increased the risk of adverse outcomes, that is a weakened reserve

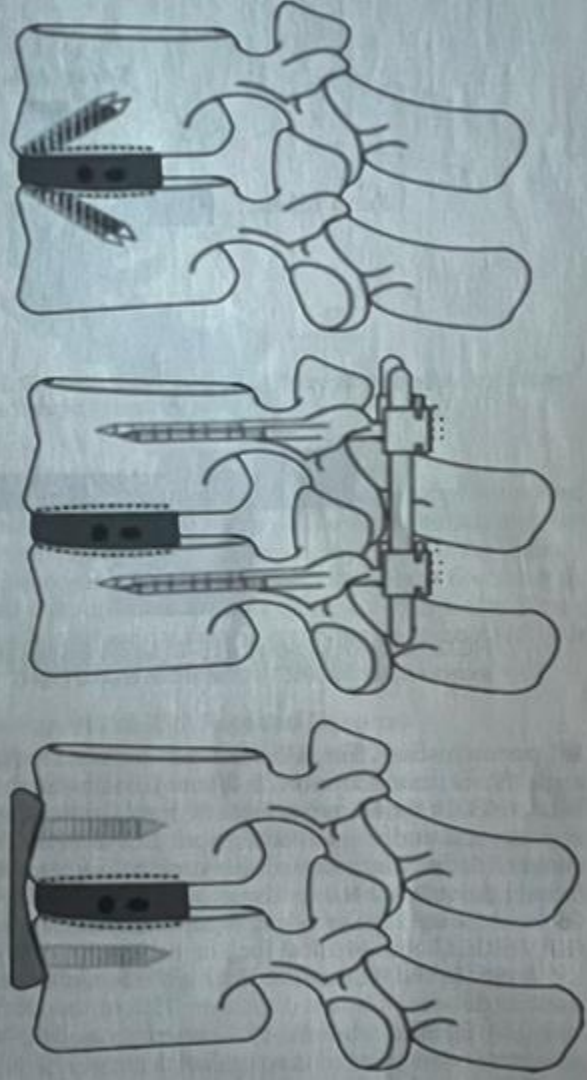
I.e. susceptibility to adverse events



Frailty

Has been shown to independently predict:

- Post op complication in some groups including elective spinal surgery



As patients having spinal surgery may experience high rate of perioperative complication, identification and management of FRAILITY and SARCOPENIA may play a role in risk prevention



ELSEVIER



The Spine Journal 18 (2018) 2354–2369



Review Article

The impact of frailty and sarcopenia on postoperative outcomes in adult spine surgery. A systematic review of the literature

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SARCOPENIA

Can impact on patient having:

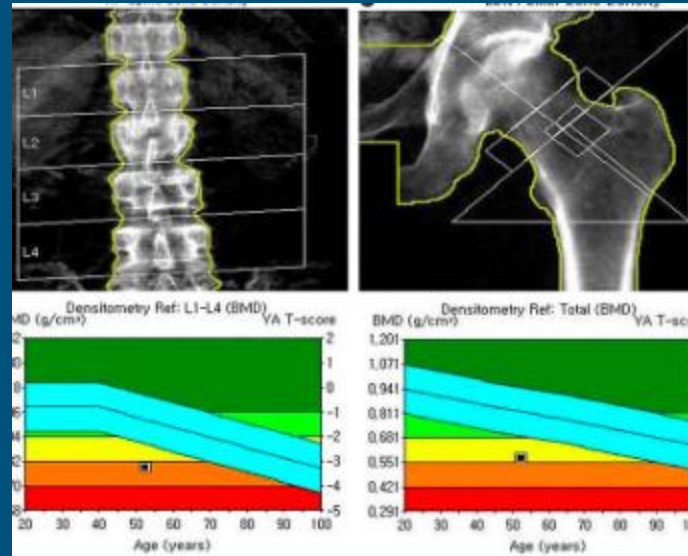
- Vascular surgery
- Major adult spine surgery
- Resection of pancreatic sarcoma
- Hepatic resection for colorectal metastases

Modified frailty index

Does not provide additional value in predicting elective transforaminal interbody spinal fusion (TLIF)

DEXA

Dual Energy Xray Absorptiometry (DEXA) is a reference standard for measuring osteopenia but not routinely used for patients undergoing spinal surgery



PROM'S

There may be an association between muscle health and PROMS (patient reported outcomes) after microdiscectomy



Adverse events on patients during lumbar spine surgery:

MAJOR AE factors

- Increased age
- Fusion surgery
- Patients overall health (ASA score >2)
- Increased blood loss during surgery
- Increased surgical time



MINOR AE factors

- Increased age
- Increased degenerative deformity
- Fusion surgery
- Increased surgical time



Increased Post Op care needs

May require care

- ICU
- HDU
- Delay in discharge directly home



The Future

Innovative therapies such as recombinant protein based vaccines created by AI to produce antibodies against attacks of A Beta proteins which bind to A beta protein clumps and dissolves them which may slow Alzheimer's disease

This may lead to other AI vaccines for frailty so that patients may not be served up as a Fried Phenotype for major surgery

Developments in Frailty

ACI (agency for clinical innovation)

- Frailty Taskforce focusing on how to improve care for people living with frailty or high risk for becoming frail
 1. Identification of frailty and those at high risk of frailty;
 2. Shared care planning and shared decision making that includes a process for goal setting, including advance care directives;
 3. Early and ongoing mobilisation and physical activity;
 4. Polypharmacy and de-prescribing inappropriate therapies, and
 5. Optimising nutrition

Frailty Index

- Vickie Irving: Deputy Chief Health Officer/Head of Clinical Innovation and Engagement at Telstra Health (Brisbane)
- An AI tool automatically categorizes aged care residents frailty phenotype while offering routine predictions of Adverse Events - falls, depression +/- mortality
- Displayed as a dashboard for staff - it is 81% accurate/effective in identifying frailty phenotypes.
- This tool uses 36 evidence based markers