

## **Ultra-processed Food Consumption is Associated with Higher Intramuscular Fat Infiltration in Individuals without Radiographic Osteoarthritis or Frequent Pain in the Knee and Hip: Data from the Osteoarthritis Initiative**

### PURPOSE

The loss of contractile muscle tissue is associated with poor health outcomes in a variety of diseases, including osteoarthritis (OA). While lifestyle factors may impact muscle quality, little is known about the influence of low-quality nutrition, specifically ultra-processed foods (UPF). The aim of this study was to assess the association of UPF intake and intramuscular fatty degeneration.

### METHODS AND MATERIALS

Participants from the Osteoarthritis Initiative at risk of but without radiological hip/ knee OA (KL grade  $\leq 1$ ) or self-reported knee/hip pain on either side at enrollment were included in this cross-sectional study. Participants without 3T thigh MRI or plausible dietary data based on Block Brief 2000 food frequency questionnaire (FFQ) were excluded. Intramuscular fat was assessed using semi-quantitative 5-level Goutallier grades (GG), ranging between 0 (no fatty streaks in the muscle) to 4 (>50% fatty signal), on axial T1W images. Each muscle was scored on both thighs per participant; sum GG scores across all muscles (GGall), bilateral flexors (GGflex) (semimebranosus, semitendinosus, biceps femoris), extensors (GGext) (rectus femoris, vastus medialis, vastus lateralis, vastus intermedialis), and adductors (GGadd) (adductors, gracilis, sartorius) were calculated. Standardized values for UPF proportion in overall annual diet (%) were extracted from the FFQ based on the NOVA Classification, which classifies food and beverages into 4 groups based on their level of processing. UPF represents NOVA group 4, indicating industrial-scale processing for increased palatability and shelf-life. Linear regression models were used to assess the relationship between dietary UPF and GG. All models were adjusted for age, sex, race, BMI, total daily caloric intake, physical activity, depression, education, and income levels.

### RESULTS

There were 666 participants (45% men, mean age 59.9 [ $\pm 9$ ] years, mean BMI 27.1 [ $\pm 4.3$ ] kg/m<sup>2</sup>). Mean GG scores and UPF are presented in Table 1A. Highest and lowest GG scores were noted for extensors and flexors, respectively. The relationship between UPF and GG scores was significant for GGall ( $\beta$  0.86 [95% CI 0.13, 1.58],  $p=0.021$ ), indicating an increase of GG by almost 1 grade for each SD increase in UPF. Significant results were also found for GGadd and GGflex but not for GGext.

### CONCLUSIONS

In a normative cohort of patients, at risk for but free of knee or hip OA by radiographic and clinical criteria, the consumption of UPF is associated with higher intramuscular fat, independent of total daily caloric intake, physical activity, or BMI.

### CLINICAL RELEVANCE/APPLICATIONS

Quality of nutrition may impact muscle quality and represents a potential target for non-invasive or preventive therapeutic approaches.