THE ROLE OF NUTRITION & EXERCISE IN MAINTAINING MUSCLE MASS, STRENGTH & FUNCTION PRE & POST FALLS & FRACTURES IN OLDER ADULTS ACROSS THE HEALTHCARE CONTINUUM: BEST PRACTICE CONSENSUS

1. SCREENING & ASSESSMENT TO IDENTIFY THOSE AT RISK OF FALLS & FRACTURES

We all lose muscle as we age; on average 8% of muscle mass is lost per decade between the ages of 40 & 70, with 15% loss per decade after the age of 70.[1,2] Sarcopenia is the advanced loss of muscle mass & function, compounded by malnutrition, disease & hospitalisation.[3]

Loss of muscle mass is associated with increased rates of falls & fractures.[4] Good nutrition, particularly adequate protein & energy intake, can help manage declines in muscle mass, strength & function.[5] Regular exercise, especially programmes that build strength & challenge balance, can help to prevent falls.[6] The combination of nutrition & exercise is considered optimal for maintaining muscle strength & function to reduce the risk of falls & fractures.[5]

WHO TO SCREEN[7]

- Adults aged over 65 years (one third of people over 65 fall at least once a year, increasing to 50% over the age of 80).[8]
- All patients who have already had a fall. Conduct multi-factorial fall risk assessment on 65+ years with falls/gait/balance impairment. More complex presentations should be referred to falls clinic for evaluation.
- Anyone identified as being at high risk of falling.
- Patients attending the Emergency Department (ED) as a result of a fall.

SCREENING & ASSESSMENT TOOLS

Use screening tools to identify those at risk

- Utilise clinical judgement & simple questions about daily activities, appetite & weight loss as a first step.
- Conduct nutritional screening on a regular basis using the Malnutrition Universal Screening Tool ('MUST') or other locally validated tools.[9]
- Identify frailty in patients aged 65+ years using the electronic Frailty Index if available. Verify the frailty diagnosis using the Clinical Frailty Scale (CFS) or similar validated tool.[10]
- Ask all 65+ years patients whether they have fallen in the last 12 months or experienced any problems associated with balance & walking.[11]
- Consider using the SARC-F to screen for sarcopenia. Self-reported 5 item questionnaire considering Strength, Assistance with walking, Rise from a chair, Climb stairs & Falls.[12]

Assess muscle strength & function at every opportunity in order to identify sarcopenia & monitor any deterioration. Use validated tools & an individualised approach (no single test is appropriate for all patients):

- Timed up & go test (TUG) – time taken to rise from a chair, walk 3m, turn, walk back to the chair & sit down. Demonstrates gait speed, muscle weakness & balance. Time of 12-15 seconds indicates high risk of falls in older people.[7] Time of ≥20 seconds indicates low performance.[12]
- Gait speed test – timed walk over 4m. Validated for falls & sarcopenia. ≤0.8 m/s indicates low performance.[12]
- Sit-to-stand test – 30 second sit-to stand or 5 times sit-to stand. Assesses lower limb function & strength. Time of >15 seconds for 5 rises indicates low strength.[12]
- Hand grip strength. Measure using a dynamometer. Grip strength values of <27 kg in men & <16 kg in women indicate low strength.[12]
- Comprehensive Geriatric Assessment (CGA). Includes physical & mental condition, functions such as mobility & balance, social circumstances & environment.

Useful resources

- https://cks.nice.org.uk/falls-risk-assessment#!scenario
- https://www.england.nhs.uk/wp-content/uploads/2017/03/toolkit-general-practice-frailty-1.pdf

2. MANAGEMENT STRATEGIES TO MAINTAIN MUSCLE MASS & FUNCTION - NUTRITION

PROTEIN & ENERGY

- Patients should have an 'adequate energy intake' as evidenced by weight maintenance (or increase if appropriate).
- Older adults have higher protein requirements due to anabolic resistance & a greater need for protein to help maintain muscle mass & recover from illness including inflammation & infection.[5]
- UK adult Reference Nutrient Intake (RNI) for protein is 0.75 g/kg body weight/day:
  - International groups including ESPEN & PROT-AGE recommend 1.0-1.5 g/kg/day for 65+ years, with up to 2.0 g/kg/day in cases of severe illness, injury or malnutrition.[5,13,14]
  - The BDA Parenteral & Enteral Nutrition Specialist Group (PENG) recommend 1.2-1.5 g/kg/day for 65+ years with acute or chronic illness or complicating medical conditions, with up to 2.0 g/kg/day in severe illness, injury or malnutrition.[15]
- Assess patient's diet to quantify their protein intake:
  - Ask detailed questions to understand what the patient is eating
  - Provide guidance on how to improve protein intake throughout the day
  - Use visual aids to demonstrate good sources of protein plus guidance on portion sizes

VITAMIN D

- Vitamin D has an important role in muscle strength & function as well as bone strength. Vitamin D deficiency is defined as serum 25-hydroxyvitamin D (25[OH] D) levels less than 25 nmol/L.[16]
- Those 'at risk' of vitamin D deficiency include people 65+ years, those who have low or no exposure to the sun (e.g. those who are housebound or in care homes) & people with darker skin.[16]
- All adults, including those at increased risk of vitamin D deficiency, should take a daily supplement of 400 IU of vitamin D.[16]
- If patients have suffered a fracture, check vitamin D status. If symptoms of vitamin D deficiency are reported such as bone or muscle pain, impaired wound healing or difficulty climbing stairs, check vitamin D status.[16]
- A total loading dose of 300,000 IU, administered daily or weekly over 6-10 weeks, should be given to correct vitamin D deficiency, followed by a daily maintenance dose of 800 IU.[16]

HMB

- ß-hydroxy-ß-methylbutyrate (HMB) is a metabolite of the amino acid leucine. It is a potent stimulator of protein synthesis & an inhibitor of protein breakdown.[17]
- HMB has an evidence-based role in the management of sarcopenia & frailty.[17]
- When an oral nutritional supplement (ONS) is indicated, consider those containing HMB to help preserve muscle mass.
- Avoid the use of over the counter HMB tablets as these may vary in terms of dose & quality.

CALCIUM

- Adequate calcium is important for strong bones & muscle function.
- The UK adult RNI for calcium is 700 mg/day. Consider suitable ONS or calcium supplements in older adults as poor dietary intake & reduced absorption may lead to deficiencies.[16]

OTHER NUTRITIONAL APPROACHES

- Ensure older adults have a good variety of foods in their diet. Consider A-Z multivitamin if any concerns.
- Ensure patients are adequately hydrated.
- Omega-3 fats may be considered, although more evidence is required about their role in older people. Good sources of omega-3 include oily fish & some seeds & nuts (e.g. flaxseed & walnuts). Consider potential pollutants & sustainability when making recommendations.

Useful resources

- https://www.bda.uk.com/foodfacts/portionsizesfoodfactsheet.pdf
- https://theros.org.uk/media/2073/vitamin-d-and-bone-health-adults.pdf
- https://cks.nice.org.uk/vitamin-d-deficiency-in-adults-treatment-and-prevention#!scenarioRecommendation:1
- https://www.bda.uk.com/foodfacts/Calcium.pdf
- https://www.bda.uk.com/foodfacts/omega3.pdf

3. MANAGEMENT STRATEGIES TO MAINTAIN MUSCLE MASS & FUNCTION - EXERCISE

- There is strong evidence to show that exercise helps to prevent falls in older people. At least 50 hours of exercise is required for optimal effect on falls prevention or 3 hours exercise per week on an ongoing basis. Programmes should challenge balance & build strength.[6,18]
- An exercise prescription is helpful for older people. Exercise should be tailored to the individual taking into account expectations, preferences, previous exercise experience & locus of control. Fitter older people can follow an exercise plan. Those who are more frail can follow chair-based exercises which may be beneficial in improving muscle strength (although there is no evidence that they prevent falls).
- Using goals to promote participation is recommended. Goals should be person centred, relevant & practical.
- Exercise is not a short term intervention & adherence is essential, with regular ongoing monitoring to assess progress.
- Provide patients with tools & information to allow them to continue to exercise independently.
- A synergistic effect is seen with protein intake & exercise as exercise makes muscle cells more receptive to amino acid-mediated anabolism.[14]

Useful resources

- www.laterlifetraining.co.uk
- https://theros.org.uk/forms/documents/strong-steady-and-straight/
- https://www.nhsinform.scot/healthy-living/preventing-falls

4. ONGOING CLINICAL/FUNCTIONAL MONITORING

- Record patients' weight, strength & function & review regularly to monitor any changes.
- Ongoing monitoring through repeat screening & assessment of muscle function is essential. Triggers for reassessment include:
  - ED attendance
  - Change in medication
  - Change in care (e.g. increase in care needs or move to care home)
  - Referral to social services for care or aids/adaptations
- An individualised approach is needed to ensure best outcomes for patients. This should be completed by a specialist service, but can be commenced on a generic level by other competent healthcare professionals if they identify the need – i.e. chair based exercises or basic functional activity advice, guidance about nutritional needs.
- Adherence is key – check regularly that patients are following evidence-based interventions.
- Encourage self-awareness & self-monitoring amongst patients.
- Follow relevant guidelines where available.[18]

Useful resources

- https://www.nice.org.uk/guidance/CG161
- https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/820673/Strength_and_balance_quality_markers_supporting_improvement_through_audit.pdf

5. EDUCATION

PATIENTS & CARERS

- Provide information to patients/carers about sarcopenia & loss of muscle mass & what that means in terms of impact on health outcomes & independence.
- Focus on simple changes & SMART goals that are easy to implement.
- Make patients/carers aware of individual protein requirements & why a high protein diet is important in older adults.
- Educate older adults about good sources of protein & ways to increase protein intake (e.g. lean meat, eggs, dairy products, nuts & nut butters, beans & legumes).
- Communicate the synergistic role of nutrition & exercise.
- Self-awareness & self-management are important factors.
- Flag & utilise existing local/national resources.

MULTIDISCIPLINARY TEAM (MDT)

- Educate all members of the MDT (e.g. from ward hostesses to physicians, social care, allied professionals) about nutrition & exercise & the difference they can make to older adults.
- Develop a directory of local services to ensure all stakeholders are aware of & know how to access available resources.

Useful resources

- https://www.ageing-better.org.uk/sites/default/files/2019-02/Raising-the-bar-on-strength-and-balance_0.pdf
- https://www.iofbonehealth.org/living-sarcopenia
- https://www.rcplondon.ac.uk/projects/falls-and-fragility-fracture-audit-programme-fffap

LOCAL INFORMATION & RESOURCES

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