Impact of Weight Loss on Handgrip Strength in Head and Neck Cancer Patients Receiving Radiation Therapy

School of MEDICINE
OHSU

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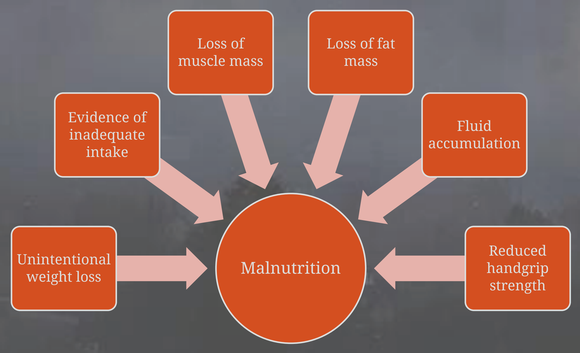
Specific Aims

- To implement dynamometer assessment of handgrip strength as part of the nutrition assessment for head and neck cancer patients receiving radiation therapy
- To investigate the relationship between handgrip strength and weight loss before and during seven weeks of radiation therapy

Background

- Malnutrition is a common complication for head and neck cancer patients receiving radiation therapy.
- The negative implications of malnutrition in this population include higher rates of morbidity and mortality, decreased quality of life, increased frequency and length of hospital admissions, as well as higher health care costs.
- Handgrip strength, a criterion for malnutrition, has gained the attention of numerous researchers due to its feasibility and prognostic relevance.
- Despite its recognized validity, minimal research has been conducted to establish normal reference values for handgrip strength during acute or chronic disease states.

Characteristics of Malnutrition



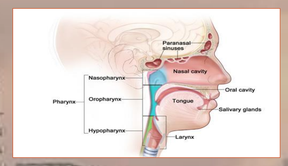
Methods

- Prospective study conducted through OHSU's Radiation Oncology Clinic.
- Eleven subjects diagnosed with head and neck cancer and prescribed seven weeks of radiation therapy.
- Hand grip strength, assessed by the Jamar® Plus Hydraulic Hand Dynamometer, and weight were recorded at the first and last week of radiation as well as the first follow-up visit.
- Each hand was measured three times and the average was calculated. Hand dominance was noted.
- Subjects were classified as malnourished if they met the Academy of Nutrition and Dietetics and American Society for Parenteral and Enteral Nutrition (AND/ASPEN) malnutrition criteria for weight loss and reduced grip strength. Reduced grip strength was defined as a grip strength two standard deviations (SD) below the normative standards provided with the dynamometer.
- Descriptive statistics were used to describe the subject population, changes in grip strength and changes in weight. Correlation between change in grip strength and change in weight was performed using Pearson's correlation.

Results

Descriptive (n = 11)		
	Mean	SD
Age (yrs)	60.8	6.2
Height (m)	1.77	0.12
Usual body weight (kg)	102.3	32.0
Initial treatment body weight (kg)	90.4	31.0
Body mass index (kg/m^2)	28.4	8.1
Days since diagnosis	49	32.7
	CACI Score	**n (%)**
Moderate comorbidity	1-5	9 (82)
Severe comorbidity	≥ 6	2 (18)

Cancer Localization	#
Auditory canal	1
Esthesioneuroblastoma	1
Larynx	1
Nasal	2
Pyriform sinus	2
Tongue	2
Tonsil	2



Average weight	Mean (kg)	SD (kg)
Usual body weight (n=11)	102.3	31.9
Initial treatment (n = 11)	90.4	31.0
Last treatment (n = 11)	83.8	27.8
Follow-up (n = 11)	80.5	25.1

Average change in weight	Mean (kg)	SD (kg)
Initial treatment – usual body weight (n = 11)	-11.9	14.0
Last treatment – initial treatment (n = 11)	-6.6	6.4
Follow-up – last treatment (n = 11)	-8.3	6.9

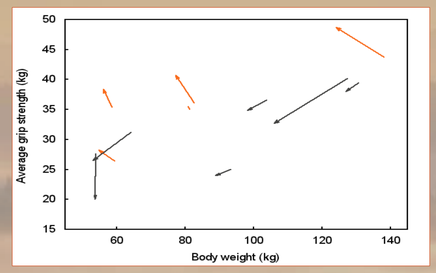
Average left handgrip strength	Mean (kg)	SD (kg)
Initial treatment (n = 11)	33.2	8.0
Last treatment (n = 11)	32.1	9.1
Follow-up (n = 2)	29.3	12.9

Average right handgrip strength	Mean (kg)	SD (kg)
Initial treatment (n = 11)	35.3	5.6
Last treatment (n = 11)	34.6	7.7
Follow-up (n = 2)	29.4	7.9

Average change in left handgrip strength	Mean (kg)	SD (kg)
Last treatment - initial treatment (n = 11)	-1.0	3.8
Follow-up - last treatment (n = 2)	-2.1	0.2

Average change in right handgrip strength	Mean (kg)	SD (kg)
Last treatment - initial treatment (n = 11)	-0.7	5.6
Follow-up - last treatment (n = 2)	-3.9	2.6

Change in handgrip strength and body weight from initial to last treatment



Correlations between changes in weight and handgrip strength

Fig 1. Right

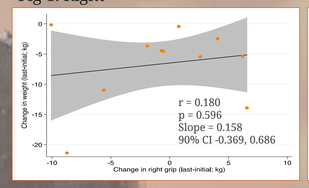
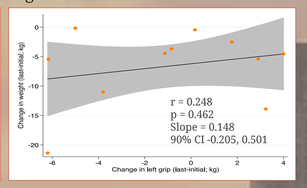


Fig 2. Left



Key Findings

- On average handgrip strength decreased with weight over time for both left and right hands.
- When the two variables were correlated the relationship between changes in handgrip strength and weight were not significant.
- All subjects lost a significant amount of weight between their last radiation treatment and follow up visit, with an average estimated loss of 0.1 kg/day

Conclusion

- Use of the dynamometer is feasible in the clinical setting.
- We find no significant correlation between handgrip strength and weight loss in head and neck cancer patients receiving radiation therapy.
- Further research is needed to establish standardized hand grip strength reference ranges.