

Accuracy of Self-Assessed Level of Activity in the Charcot Patient Population: Preliminary Results

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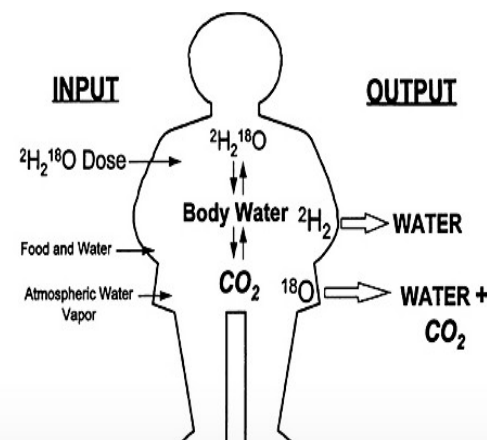
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Statement of Purpose

Quality of Life Surveys are often utilized in orthopedic literature to quantify the degree of impact a disease state has on a population of patients. In particular, several articles have been published which identify the Charcot disease state to be extremely limiting to the quality of life of a patient. These articles identify the level of activity of the Charcot population to be well below that of the average diabetic. Return to function is often a predictor of success orthopedic literature, which identifies the Charcot population as a high risk and low reward surgical endeavor. Numerous studies have reported on the discrepancy in self-assessment surveys such as QOL/ IPAQ. The purpose of this study is to identify the discrepancy between patients self-reporting and actual level of physical activity seen in the Charcot population. As a secondary aim, we hope to identify the variations in location of Charcot collapse and return to activity.

Materials

20 Charcot diabetics were subdivided into test cohorts (midfoot/ Ankle). Anthropomorphic information was obtained. In this study two biologic markers were used to calculate Total Energy Expenditure (TEE). A three point sampling protocol was utilized for urine collection. International Physical Activity Questionnaire (IPAQ) was used for QOL assessment which has been validated in 5 areas of physical activity.



Methodology

21 Charcot diabetics completed QOL assessments and then ingested 2 mL of doubly labeled water for energy expenditure analysis. Patient returned 10 days later and underwent urinalysis. Energy expenditure of the patient was calculated from urine samples. These estimates were then compared to QOL to better identify the accuracy of these types of surveys. Results from the IPAQ were converted into Metabolic Equivalents (MET) which help to identify their activity as Low, Moderate or vigorous activity. Total Energy Expenditure was determined based on the below equation.

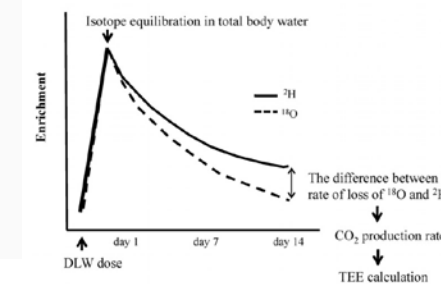
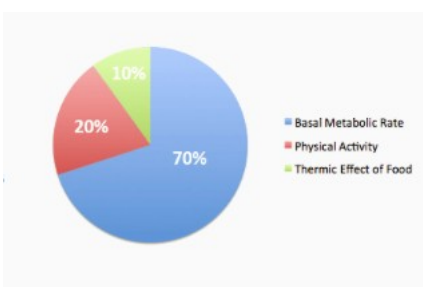
Literature Review

Quality of life survey reviews five key components of health including: physical state, psychological state, social support, material state and a patient's environment. In recent years, there has been mounting interest in quality of life assessments as they relate to healthcare. In the new era of organizational health care delivery, predictors of post-operative outcomes are of great interest to hospital systems, insurance companies and surgeons.¹⁵⁻¹⁷ These estimates are used to define treatment algorithms and quality measures. Within the quality of life literature DHP, SF-36, IPAQ and other quality of life surveys (QOLS) have been used to describe an individual's "self-assessed" level of health.^{15, 16} Although our team finds some value in these assessments, we are troubled with inconsistencies they demonstrate, particularly in the realm of psychosocial and physical markers of health. DHP, SF-36, IPAQ and other QOLS have shown decreased accuracy in patients with multiple comorbidities, especially in those diagnosed with diabetes.¹⁸⁻¹⁹ Diabetes often confounds markers of psycho-social health and physical health. A study by Haywood et al. suggests the use of SF-36 is recommended only in the assessment of health with limited morbidity. Additionally, they found within the elderly community that SF-36 was not suitable for studies that monitored large changes in health associated with intervention. Because QOLS assess an individual's current health state using retrospective, re-collective self-assessments, extreme over/under estimation has been cited with this testing modality.³²⁻³⁴ Many studies have been performed which demonstrate the extreme inconsistencies in this data collection method.³²⁻³⁵

Results

20 patients were recruited for this study. 2/20 patients developed Charcot within the ankle while 18/20 were isolated to the joints of the Midfoot. All patients had undergone some form of surgical intervention to allow them to return to ambulation without the assistance of assistive devices. 2/21 patients identified themselves as engaging in moderate activity while the remainder identified as Low. Conversely, the calculated TEE revealed 11/20 patients were identified as moderate level of activity while only 2/21 were calculated as low. Additionally, 2/21 participants had a calculated TEE identified as vigorous. In no instance during this study did a participant accurately identify their level of activity, with the vast majority underestimating their activity level by nearly 200-600 METs. Patients consistently identified their self assessed level of health as poor (10/21) and very poor (11/21).

Patient	Site	REE (Calculated)	TEE (Calculated) kcal	TEE (Measured) kcal	Phys. Activity	IPAQ-LF	Calculated Phys. Activity
1	Midfoot	2039	2651	1405	1.45	Low	Moderate
2	Midfoot	2132	2772	2417	1.13	Moderate	Low
3	Midfoot	2815	3660	3284	1.11	Low	Low
4	Midfoot	1672	2173	2246	1.35	Low	Moderate
5	Midfoot	1639	2131	2502	1.53	Low	Moderate
6	Ankle	2059	2677	1713	1.2	Low	Moderate
7	Midfoot	1869	2804	2602	1.4	Moderate	Moderate
8	Midfoot	1869	2430	3816	2.04	Low	Vigorous
9	Midfoot	1888	2468	2341	1.2	Moderate	Moderate
10	Ankle	1590	2704	1993	1.3	Low	Moderate
11	Midfoot	2103	2733	1254	2.17	Low	Vigorous
12	Midfoot	1895	2464	2235	1.1	Low	Low
13	Midfoot	1688	2195	***	N/A	Low	N/A
14	Midfoot	1522	1979	1183	1.6	Low	Moderate
15	Midfoot	1776	2308	1478	1.9	Low	Moderate
16	Midfoot	1753	2279	967	0.55	Low	Low
17	Midfoot	1473	1915	1682	1.1	Low	Low
18	Midfoot	1476	1918	1970	1.3	Low	Moderate
19	Ankle	1912	2486	1243	1.5	Low	Moderate



Analysis & Discussion

QOL assessments are often used to identify the burden of disease state placed on a population. In more recent literature, QOL has been used in the Charcot population labeling them as low physical ability and poor psychological outlook. It is well established in the literature that QOL assessments may be unpredictable in patients with chronic disease. Charcot patient appear to be unable to objectively assess their disease state. As with most chronic disease states, depression and comparative thinking interfere with assessments of satisfaction and return to activity.

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