H15   Dual Energy X-ray Absorptiometry (DEXA) Scans for Skeletal Remains Identification of Anorexia Nervosa

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After attending this presentation, the audience will understand the importance of DEXA scans for analyzing individuals with osteoporosis and using them for possible identification of unknown skeletal remains. This study presents new criteria for skeletal remains identification when dental remains are unavailable, and demonstrates the long-term impact of anorexia nervosa on postmortem signs as evidenced by forensic radiological examination.

This presentation will impact forensic community by providing new criteria for skeletal remains identification and understanding of the long term impact of anorexia nervosa on postmortem findings as evidenced by forensic radiological examination. The attendees will understand the importance of DEXA scans for analyzing individuals with osteoporosis and using them for possible identification of unknown skeletal remains.

Anorexia is a well-known social problem that is constantly changing the face of eating disorders. The immediate, physical and emotional harm caused by anorexia seems to be understood. Many young women with a history of anorexia tend to develop osteoporosis and reduced bone density, which leads to fractures. The severity of these fractures ranges from minor hairline fracture to femoral head collapse, which is seen in extreme cases of anorexia nervosa. However, the long-term collective effects are more difficult to interpret. Few postmortem forensic and anthropological studies have addressed this issue.

This study examined the validity and problems associated with the use of radiological examination of skeletal remains as an identification tool when there is a concomitant history of anorexia. For instance, if long bone remains are found from an unidentified individual, and concluded to be from a young female with osteoporosis, they can be compared against missing person reports and medical histories to find the probable missing Jane Doe(s) providing that it is recognized to possibly originate from a young anorexic person rather than an older person with osteoporosis.

DEXA scans of ten anorexic patients; nine non-anorexic (older) patients with osteoporosis, and one normal control were obtained from Sharp Outpa- tient Imaging Center, San Diego, CA. Bone mineral density (BMD) and T score, were also obtained and used to analyze the radiographs. T score defines the amount of bone a person has compared to an individual of the same gender with normal bone mass. Questionnaires were also sent to 75 doctors/physicians/specialists across the country in order to get their opinions regarding the DEXA scan data and its application to forensic science as shown in this study.

Subjects were further divided into groups based on their T scores and diagnosis. Group 1(N=6) was anorexic only, Group 2 (N=5) was anorexic with osteoporosis, and Group 3 (N=9) was non-anorexic with osteoporosis. The DEXA scan data of these groups was compared using Student's t test (p-value < .05) and Pearson product moment correlation coefficient (r) was used to compare the BMD and T scores between hip and lumbar spine.

When the DEXA scan data of the groups were compared BMD total hip in Group 2 vs. Group 3 only marginally significant (p-value = .084). BMD lumbar spine in Group 1 vs. Group 2 and Group 2 vs. Group 3 was not signif- icantly different (p-values .184 and .242, respectively). T score lumbar spine in Group 1 vs. Group 2 and Group 2 vs. Group 3 was also a non-significantly different (p-values .136 and .603, respectively). BMD and T score total hip and lumbar spine were also shown to have a positive correlation with one another (r = .881 and .890).

This radiological data analysis would support the assumption that skeletal remains of a young anorexic individual may be mistaken for an older individual with osteoporosis, even if it is not in the hip region. Additionally, a significant portion of the questionnaire data, and specifically the question asking whether it is possible to confuse young anorexic bones and older osteoporotic bones, were in agreement with that assumption.

This study showed a high possibility for incorrect differentiation between young anorexics with osteoporosis and older non-anorexics with osteoporosis, when skeletal remains alone are examined, especially in the lumbar region. While DEXA scans are very useful for current physical infor- mation, they are also imperative for studying long term anorexia. The scans track all patients' measurements from the day they are diagnosed through every follow-up measurement until they either die or stop receiving treatment. These radiological records can be very informative for postmortem identification (i.e., mass disasters for example). Bone density scans also aid in the differentiation between malnourished remains and other bone pathologies, which by themselves are useful for identification of human remains.

DEXA Scans, Anorexia Nervosa, Osteoporosis