443 TROUBLESOME TARSALS

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HISTORY – A 17 year old schoolboy footballer and cricketer presented to the Clinic shortly after the beginning of the football season. He complained of diffuse aching in his left foot. This worsened to pain during an exercise session which continued for up to 12 hours after cessation of activity. The pain was localised to the superomedial aspect of the foot. There was no history of trauma to the foot or ankle, but training had increased markedly over the previous six weeks.

PHYSICAL EXAMINATION – No swelling/abnormal bony contour. There was a full range of movement at the ankle and sub-talar joints. Power in each muscle group was normal; all resisted movements were pain free. The ankle was stable. Marked tenderness was noted locally over the medial half of the navicular dorsally. The right foot was entirely normal. Gait analysis revealed moderate pronation.

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DIFFERENTIAL DIAGNOSIS
1. Navicular stress fracture
2. Tibialis anterior tendonitis
3. Tibialis posterior apophysitis
4. Osteoid osteoma
5. Inflamed talonavicular joint

TEST AND RESULTS
Nuclear bone scan: Early static and delayed bone images show marked focal increased isotope activity in the area of the left navicular bone consistent with a fracture. On the right there is mild isotope activity in the region of the navicular as well as the posterior process of the talus.
CT scan: On the left there is an 80–90% sagittal fracture involving the navicular bone. The fracture is associated with a small ossicle in the dorsal proximal articular margin of the bone. On the right is a long standing appearing lesion affecting the navicular too. This could represent an old ununited fracture or a bipartite navicular.
X-ray: On the right side, the presence of two bones comprising the navicular bone is confirmed.

FINAL DIAGNOSIS
Left-sided navicular stress fracture.
Right-sided bipartite navicular.

TREATMENT
1. Non weight bearing cast immobilisation for 6 weeks.
2. Removal of cast and check for tenderness; no further tenderness.
3. Initial physiotherapy to alleviate stiffness and improve range of movement.
4. Functional rehabilitation increased.
5. Return to sport 6 weeks after removal of cast.

C-32 SLIDE ENERGY BALANCE & WEIGHT CONTROL II

444 EARLY EXERCISE ATTENDANCE PREDICTS SUBSEQUENT EXERCISE PARTICIPATION AND WEIGHT LOSS

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As part of a study on exercise and weight loss, we tested two hypotheses: (1) that attendance at exercise sessions (ATT) would be a better predictor of weight loss than self-reported weekly energy expenditure (WEE), and (2) that attendance at exercise sessions during the initial weeks of treatment would predict subsequent attendance and overall weight loss. These hypotheses were tested in 35 obese women (aged 25-55; BMI = 36.2 kg/m^2) who were participating in a 24 wk behavioral weight control program. All subjects attended weekly behavioral weight loss meetings and walked 3 d/wk under supervision. All subjects walked in close vicinity of their work/home sites. Walking distance progressively increased to 2 miles per session. Weight loss over the 24 weeks averaged 17.9 ± 1.9 lbs, ATT averaged 67.6 ± 3.9%, and WEE averaged 834.1 ± 152.5 kcal/wk. Across the entire 24 wks of the program, weight loss correlated significantly with ATT ($r = 0.65$, $p = 0.0001$) but not with WEE ($r = 0.32$, NS). Furthermore, ATT during wks 1-6 (the first quartile of the program) predicted ATT ($r = 0.75$; $p = 0.0001$) as well as WEE ($r = 0.37$, $p = 0.02$) throughout the remaining 18 wks of the program. Moreover, ATT during this first quartile was also able to predict overall weight loss ($r = 0.37$; $p = 0.03$). These data suggest that attendance at initial exercise sessions can be used to identify subjects who should be given additional attention to increase their chances for successful weight reduction.

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445 THE EFFECT OF DIET AND EXERCISE ON BASAL METABOLIC RATE IN OLDER WOMEN

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Energy restriction can result in a significant decrease in lean body mass (LBM) and basal metabolic rate (BMR), which can hinder further weight loss. The effect of diet and diet+exercise on basal metabolic rate was studied after 24 weeks of intervention in 40 moderately obese (120-140%), post-menopausal women (65.6±3.3 yrs). During the baseline period daily energy need (DEN) was estimated from basal energy expenditure and self-reported activity records. Group I (n=16) reduced daily energy intake (DEI) 500 kcal from DEN and expended an additional 200 kcal/d by alternating walking and moderate resistance training for one hr five d/wk. Group II (n=13) and Group III (n=11) reduced DEI by 500 kcal/d and 700 kcal/d, respectively, from DEN. BMR was determined on 3 consecutive mornings at baseline (B) and after 24 weeks (24W) by indirect calorimetry. Two-way ANOVA with Tukey post hoc tests ($p \leq 0.05$) indicated a significant decline in BMR for Group III only (mean BMR at B=1447±140 kcal/d and 31.6 kcal/kgLBM/d; at 24W=1326±152 kcal/d and 29.2 kcal/kgLBM/d). All groups experienced a significant loss of body weight (mean body wt at B=79.2±8.0 kg; at 24W=72.8±8.0 kg) and fat mass (mean FM at B=33.3±6.0 kg; at 24W=27.8±5.8 kg). LBM did not change significantly across time or treatments (B=43.0±5.2 kg; 24W=42.5±5.1 kg). These data suggest that older women consuming 500 kcal/d less than energy need can achieve significant weight loss without a decline in BMR or LBM, and this maintenance of BMR and LBM can be achieved with or without exercise. An energy deficit of ~700 kcal/d from diet alone may represent a threshold at which energy conservation begins to occur, and this may hinder further weight loss.

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446 LEAN TISSUE IS PRESERVED IN RESPONSE TO DIET AND EXERCISE INDUCED WEIGHT LOSS IN OBESE MEN

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The purpose of this study was to investigate the effects of two treatments, diet and aerobic exercise (DA) or diet and resistance training (DR), on lean tissue (LT) distribution in obese, android men. Thirteen men participated in the sixteen week study: DA (N=5), DR (N=6) and controls (C)(N=2). The diet for both the DA and DR groups was prescribed to create a daily deficit of 1000 kilocalories (239 kJ). Lean tissue distribution was assessed pre- and post-intervention using a magnetic resonance imaging (MRI) model in which 41 images were obtained for each subject from head to foot. The DA and DR groups were similar with respect to body mass index (31.0±2.6 vs 33.4±4.0), waist to hip circumference ratio (1.02±0.06 vs 1.00±0.05) and MRI-assessed whole-body LT (57.0±7.6 vs 61.8±5.6, liters)($p > 0.05$). Body weight was significantly decreased in both treatment groups (DA:10.9±2.7, DR 13.0±4.6, kg) but unchanged in the C group. Whole-body LT did not change in any of the three groups ($p > 0.05$). A segmental MRI analysis revealed that LT was unchanged within the arm, abdomen/torso and leg regions in both the DA and DR groups ($p > 0.05$), suggesting a uniform preservation of LT throughout the body. Furthermore, skeletal muscle which comprises the majority of the LT in the arms and legs, was unchanged in the DA and DR groups. These preliminary observations demonstrate that in obese, android men, lean tissue and skeletal muscle are preserved in response to weight loss induced by either aerobic or resistance exercise in combination with moderate caloric restriction.

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447 USE OF A MAXIMAL GXT FOR PREDICTING SUBMAXIMAL EXERCISE RER AND AEROBIC FITNESS IN OBESITY

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The purpose of this research was to use gas exchange data from a maximal graded exercise test (MGXT) to determine whether regression equations for predicting respiratory exchange ratio (RER) during submaximal exercise were similar between normalweight and obese adults; to determine the accuracy of predicting submaximal exercise RER in these two groups; and to determine if maximal oxygen consumption (MVO_2) is a valid indicator of aerobic fitness in obesity. Obese (n=86, body fat >30%, hydrostatic weighing) and normalweight (n=51, body fat ≤30%) adults received a MGXT (Balke), where VCO_2 and VO_2 were measured every 30 s. When RER was regressed on $\%MVO_2$, identical prediction equations were derived for both groups [RER=(0.39 X $\%MVO_2$) + 64]. The correlation coefficient (r) and standard error of estimate (SEE) were r=0.67, r=0.61 and SEE=7, SEE=8 for the normalweights and obese, respectively. MVO_2 expressed as ml/kg/min was lower (t-test, $p < 0.000$) in the obese (26.1 ± 0.5, Mean ± SEM) than in the normalweights (34.5 ± 1.1), suggesting a lower fitness level for the obese. However, when MVO_2 was expressed as l/min there was no difference between the normalweights (2.7 ± 0.1) and the obese (2.4 ± 0.1). Moreover, when MVO_2 was expressed relative to lean body mass (ml/kg LBM/min), the obese (42.6 ± 0.8) and normalweights (45.7 ± 1.3) were again similar, inferring that muscular aerobic capacity was the same for both groups. MVO_2 was significantly ($p < 0.001$) related ($r = 0.81$) to LBM in the obese as was kg body fat related to LBM ($r = 0.69$, $p < 0.001$). These data suggest that although submaximal exercise RER values can be predicted from a MGXT, the SEE is too large for practical application in exercise prescription. Furthermore, MVO_2 in ml/kg/min does not delineate muscular aerobic capacity in the obese.

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