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## A-27 Thematic Poster - Exercise and Joint Health

Wednesday, May 27, 2015, 9:30 AM - 11:30 AM

Room: 28D

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97 **Chair:** Dustin Slivka, FACSM. *University of Nebraska at Omaha, Omaha, NE.*

*(No relationships reported)*

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98 Board #1 May 27, 9:30 AM - 11:30 AM

### Effects Of 7-week Shoulder Exercise Intervention On Joint Mobility, Strength, And Function In Diabetics And Non-diabetics

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Diabetics have limited shoulder mobility and higher prevalence of shoulder pain and injuries due to accumulation of advanced glycation end products (AGEs) in soft tissue around the joint. AGEs stiffen collagen fibers, thereby limiting joint mobility and increasing risk of soft tissue lesions. Shoulder exercises can improve shoulder mobility, strength, and ability to perform activities of daily living. However, it is unknown if diabetes affect individuals' responses to exercises.

**PURPOSE:** To compare the effects of 7-week shoulder exercise program on shoulder range of motion (ROM), strength, and function between diabetics/pre-diabetics and non-diabetics.

**METHODS:** Shoulder ROM, strength, and function were measured pre/post 7-week exercise intervention. Shoulder internal rotation (IR) and external rotation (ER) ROM were measured using a digital inclinometer. Muscle strength (elevation, retraction, IR, and ER) were measured using a handheld dynamometer. Shoulder function was assessed using Disabilities of the Arm, Shoulder, and Hand (DASH) and Shoulder Pain and Disability Index (SPADI). The improvements in variables in two groups were compared using mix-model ANOVAs. Participants with low compliance (<70%) or complaints of shoulder pain at the beginning/during the study period were excluded.

**METHODS:** A total of 6 diabetics/pre-diabetics and 8 non-diabetics were included in the analyses. There were no significant group differences in intervention effects. In both groups, intervention resulted in improved ER ROM (p=.002), IR (p=.004) and ER strength (p=.010), DASH (p=.010) and SPADI (p=.025) scores. All four participants who were excluded due to shoulder pain were diabetics/pre-diabetics, but they were older (69.8±7.8 years) compared to the rest of the participants (55.1±8.2 years).

**DISCUSSION:** Shoulder exercises were beneficial in improving shoulder mobility, strength, and function in diabetics and non-diabetics alike. Four participants with diabetes/pre-diabetes complained of shoulder pain at the beginning/during the study. However, this is likely attributed to the higher prevalence of shoulder pain in diabetics and in older individuals. Introduction of routine shoulder exercises at a younger age may be beneficial in improving shoulder function, regardless of individuals' diabetes status.

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99 Board #2 May 27, 9:30 AM - 11:30 AM

### The Effect Of Different Post-injury Rest Days In Rabbit Patella-patellar Tendon Entesis Acute Injury Healing

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Improper post-acute injury (PAI) training increased the risk of tendon entesis (TE) chronic injury.

**PURPOSE:** to reveal the rest days' effects on the PAI healing process of TE.

**METHODS:** 35 rabbit hindlimbs were assigned to control (CON, n=7), acute injury (AI, n=7), and rest 1, 2, 3, and 4 days before restarted training group (P1, 2, 3, and 4, n=7 respectively), the left hindlimb was used as the injury groups. The acute injury was established by administering one 7 plum-blossom needle puncture; the PAI training groups performed an isometric contraction by electric stimulation in 12% of quad peak tetanic force training for 2 hours/day, 3 days/week, for 4 weeks. The patella-patellar tendon entesis (PPTE) complex was harvested for measure the fraction of bone over total volume (BV/TV %), fraction of bone surface (BS) over BV (BS/BV %), interception surface (i.S mm<sup>2</sup>), trabeculae number (Tb. N), and thickness (Tb. Th) by microCT. The morphological evaluation, cell density (CD), and fibrocartilage zone thickness (FZT) were used to reveal the injury healing.

**RESULTS:** Compared with the CON, AI group showed poor cell profile, tidemark unclear, and chondrocytes proliferation. Compared with the AI, P1 and P2 group showed worse cell alignment, chondrocytes dysplasia, collagen fibre, and tidemark disappear; P3 and P4 group showed better cell alignment, tidemark, and collagen wavy. CD of CON (14.42±3.57 cell/100×100 um) was higher than P1 (9.22±1.85), P2 (7.37±2.88), P3 (9.3±1.74), and P4 (8.8±1.81) (respectively, p<0.01); Compared with AI (12.02±3.51), only P2 was significantly decreasing (p<0.01). The FZT of the CON (299.49±100.52 um) was thicker than AI (255.66±83.24, p<0.01), the most thick FZT was found in P1 (p<0.01), then gradually returned to normal in P4. The FZT of AI was significantly less than P1, P2, and P3 (respectively, p<0.01). The BS/BV of CON was significantly less than the P1 (p<0.01), P2, P4, and AI (respectively, p<0.05). The highest value of i.S was in the P2, it was higher than the CON, P3, and P4 group (respectively, p<0.05). Tb.Th of the CON was significantly thicker than that of all the other groups (p<0.01, respectively). Only the Tb.N of CON was less than the P1 (p<0.01) and P2 (p<0.05), no different was found among other groups.

**CONCLUSION:** The results of this study systematically described the effects of different restarting PAIT time and found that restarted training at PAI 3 day could get much better recovery than at 1 or 2 day.