

Analysis of current fitness expectations and the effects of cross-training implementation on collegiate dancers

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Thesis: Dance specific training may lead to overuse injuries without the supplementation of a full body conditioning program. If dancers participate in a cross training program designed to include all of the components of fitness (strength, endurance, power, body composition, balance, agility, and flexibility), with emphasis on balancing muscular strength, this may result in a reduction of common overuse injuries as well as improve performance and physical ability.

Research Methods:

- Administration of a dance student questionnaire to determine participants' knowledge of supplemental training methodologies, level of activity in them, perceived value of cross conditioning and willingness to cross train, support of mandatory conditioning classes included in the curriculum and injury histories prior to SFU admittance and post admittance.
- Interviews (2 university dance professors, 3 studio dance instructors, 1 kinesiology professor, 2 personal trainers) to determine participants observations of common weaknesses and injuries in dancers, their perceived value of cross conditioning and whether they suggest or offer it to students, fitness habits they expect of dance students, and university athletic training protocol and fitness habit expectations of team athletes (for comparison).
- Development and administration of a 13 week cross training program given to SFU dance student participants. Three sets of fitness tests were carried out, during the first, fifth and thirteenth week of the program. The workouts were designed to include all components of fitness (stated above), with a progression of focus from full body stability to strength, and then to power.

Our standardized fitness test

- 6 min run, as many lengths of 100 ft. as participant can complete
- Pushups, as many as participant can complete without falter
- Squat Jumps, as many as can be done in 1 minute
- Squat Thrusts, as many as can be done in 1 minute
- Plank Hold, for time
- Back Extension, for time
- Max (full) Sit ups, as many as can be done in 1 minute

Our progressive program

- Month 1:** Increase aerobic capacity, introduce exercises and teach proper alignment, focus on spine placement and neuromuscular control, hip joint placement / movement, knee tracking and core control
- Month 2:** Build aerobic capacity and muscular endurance, challenge core stability with more complex exercises, focus on shoulder placement / control, glute and hamstring strength, anterior and posterior sling strength.
- Month 3:** plyometric, isometric and full body explosive exercises, resistance exercises using partner work, isometric core exercises that challenge stability, and focus on speed with floor-to-stand exercises.

Sample Workout: 3 sets of 10 repetitions of each exercise

<u>Circuit 1</u>	<u>Circuit 2</u>	<u>Circuit 3</u>	<u>Circuit 4</u>
PUSHUPS	MOUNTAIN CLIMBERS	SQUAT JUMPS	OVERHEAD SUMO SQUATS
FRONT LUNGES	BROKEN PUSHUPS	HIP BRIDGES	BICYCLE CRUNCHES
SQUAT THRUSTS	SPRINTS	TUCK JUMPS	SINGLE LEG DEAD LIFTS
SIDE LUNGES	RUSSIAN TWISTS	ROLLING T'S	
1min jumping jacks	1min plank hold	1min jumping jacks	1min plank hold

Results:

Student Questionnaire (14 participants)

- Participation in supplemental training: 78% yoga and/or pilates, 20% core work, 20% aerobic conditioning (7% using various training methods)
- Perceived value of cross training: 100% reported a high value of cross training.
- 92% of participants were willing to cross train if there was enough time in their schedule.
- 84% of pre-admittance injuries were related to the knee and ankle/foot. 50% of post admittance injuries were related to the knee and ankle/foot, 50% related to the spine.

Interviews (9 participants)

- Common weaknesses found in dancers: Core control, especially lower abdominals, low aerobic capacity / endurance, muscular weakness in end ranges of motion, weak gluteus medius and upper body (especially in females), weak and excessively flexible hamstrings, poor spinal alignment and poor nutrition.
- Perceived value of cross training for dancers as supplementary conditioning: 8 out of 8 specialists reported cross training as valuable and effective. All 5 dance instructors interviewed incorporate forms of strength training in their classes (outside of dance technique training).

Fitness Test (4 participants)

- The largest improvements were in the back extension and plank hold
- Upper body and lower body strength did improve but without significant gains
- Cardiovascular ability also improved, but results were hindered due to pre-existing injuries preventing participation or completion of the 6 minute run.

Conclusions:

- Student fitness habits are highly influenced by suggestions from their instructors.
- There is a very high student interest in cross training with little knowledge or guidance on how best to train.
- Students would support a conditioning program being added to their curriculum if there was adequate time (there must be consideration for total work load).
- Specialists interviewed support cross training as supplementary conditioning for dancers and dance instructors interviewed incorporate strength training exercises into their dance classes.
- In contrast to collegiate dancers, collegiate athletes have very direct guidance on supplementary conditioning.
- There could be a correlation between participation in our program and improvement in the administered fitness tests.
- There were no new injuries reported during the duration of our 13 week program. However, for more conclusive evidence of a relationship between participation in our program and a possible reduction in injury occurrence, additional experimentation is required.
- The addition of a control group (who participates in fitness testing and dance technique classes but not in the exercise program) in a repeat experiment would be required to show a stronger correlation between the exercise program and the fitness improvements.
- While a conditioning or cross training program such as ours could improve physical abilities of dancers and possibly reduce injury occurrence, improvement in dance technique is likely directly related to dance specific technique training.
- Standardized dancer fitness testing data could be useful for future research, especially with a larger and more widespread pool of data.

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