

Splits Training for a Dancer: Strengthening and Stretching Utilizing Proprioceptive Neuromuscular Facilitation

Kailee Sylvester, SPT

Eric Shamus, PhD, DPT, CEEAA, CSCS; Mark Erickson, PT, MA, DScPT, OCS
Florida Gulf Coast University, Department of Rehabilitation Sciences, Fort Myers, FL, USA

Introduction

- Flexibility is a common goal for many dancers regardless of style. Many dancers practice static and ballistic stretching to achieve their goals. Different types of stretching can address total muscle length and tone. Many dancers report hesitation to strength training due to the strict body image standards of the dance industry.
- Active mobility and strength within the active range is essential to maintain range of motion achieved through stretching.

Background

- Flexibility is a common goal for many dancers regardless of style. Many dancers practice static and ballistic stretching to achieve their goals. Different types of stretching can address total muscle length and tone. Many dancers report hesitation to strength training due to the strict body image standards of the dance industry.
- Active mobility and strength within the active range is essential to maintain range of motion achieved through stretching.
- The discussion of required flexibility for a dancer varies based on the joints of the lower extremity and style of dance. In regards to hip mobility, the term oversplit is commonly used to describe the legs in the frontal or sagittal plane surpassing 180 degrees (See Figure 1). The split is an ideal movement in a variety of dance forms that many dancers aim to achieve at some point in their career, and to many serve as a benchmark to measure flexibility.

Study Purpose

- This case report discusses the outcomes following the use of alternative flexibility training methods including strengthening, static stretching, and proprioceptive neuromuscular facilitation (PNF) hold relax and contract relax stretching to safely increase flexibility in a dancer with a significant decrease in available active flexibility due to high tone since childhood. This tone, based on subject report, has limited her ability to transition into professional dance spaces despite her talents, and limit her tolerance to different types of dance due to shoe wear.
- In addition, this report aims to demonstrate the impacts of dancer education on flexibility and biomechanical concepts on dancer's confidence with exercise and reported compliance with independent training.

Subject Description

- The subject is a 25 year old female singer with a lifelong non-professional dance history of over 5 dance styles. Her past medical history included high- normal tone in her lower extremities bilaterally, decreased bilateral ankle dorsiflexion for her entire life, and intermittent toe walking that she can control.
- She reported not knowing a formal medical diagnosis causing her high- normal tone. She reports her tone varies with functional activities, and often increases with stair ambulation, walking quickly or running, and hill ambulation.

Assessment

- The dancer initially presented with bilateral decreased active and passive dorsiflexion range of motion limiting demi plie and lunge range of motion.
- Her decreased ankle range of motion also limited jump height within assessment.
- Decreased hip abduction and hip flexion range of motion in standing noted during functional assessment of common ballet combinations.²⁴
- Lower extremity range of motion was assessed using functional movement screening including: front and middle splits, squat with wide base of support and bilateral external rotation (equivalent of a plie in second position with turn out) and squat with normal base of support.

	Initial Assessment	Final Assessment
Left Front Split	112	127
Right Front Split	113	127
Unloaded Middle Split	173	177
Loaded Middle Split	115	137

Training Program

- The training program utilized within this 8 week training program included weekly comprehensive virtual training sessions including exercises for all muscle groups targeted, and a daily home exercise program. All sessions and daily workouts consisted of three sections: warm up, main exercises, and cool down.
- Warm ups included dynamic stretching of targeted muscle groups and cardiovascular exercises to increase blood flow for 5 to 10 minutes.
- Main exercises included multi- joint and single joint exercises targeting dance specific functional needs and incorporating strength throughout the full available active range of the joint.
- Cool down sections included PNF hold- relax stretches using the available environment for resistance, including walls, floors, and furniture as needed.
- Based on NSCA fitness training guidelines, the home exercise program was segmented into 3 sessions targeting 3 muscle group focuses: core, glutes and hamstrings, and quadriceps and calves. Exercises followed NSCA strengthening parameters and were intermittently temporarily modified based on subject tolerance.²⁵
- Additional interventions included the daily use of ankle weights for 10 minutes twice a day to influence neuromuscular control of high tone in posterior chain limiting hip flexion and dorsiflexion with functional activities.

Discussion

- Improvements in range of motion were evidenced by a 15 degree improvement in front splits and 22 degree improvement with middle splits.
- Quality of motion, end range control, and balance were improved throughout training sessions, with consistent improvements seen each week.
- Additionally, quality of control within ankle limits of stability during walking, lunges and sustained squat positioning demonstrated significant improvements.
- Through strengthening exercises using functional positions and activities, strength and control were the clearest improvements week by week.
- Due to the history of reported hypertonicity in bilateral lower extremities, gaining strength and control of available range became the more prevalent goal then simply increasing available passive range.

Conclusions

- This case report demonstrates the impacts of an 8 week strengthening and PNF focused program on neuromuscular control and flexibility in a young adult dancer. Hip, knee and ankle neuromuscular control and active range of motion demonstrated clinically significant improvements as evidenced by increased ease and depth of motion with functional activities including squats and splits after this 8 week flexibility program.
- This case report exemplifies potential strategies that can be utilized in the training of performing artists.
- Additionally this case report highlights the potential usage of tone specific rehabilitation techniques out of the stereotypical pediatrics populations.

Clinical Implications

- Proprioceptive neuromuscular facilitation is commonly used in physical therapy practice in the form of manual resistance. This case report demonstrates the potential usage of PNF techniques using the available environment for resistance, in order to facilitate increases in range of motion within telehealth services.
- This training program has implications beyond performing artists, to also demonstrate the effects of long term usage of PNF strategies on flexibility.