Neuroplasticity and Martial Arts: Implications for a New Method of Reflex Integration

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Acknowledgments

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Agency: Sprocket Therapy Solutions LLC.

Sprocket Therapy Solutions’ Mission:

• To build bright substantial futures alongside patients and their families.
• To enhance patients’ and their families’ quality of life, thereby contributing to the overall health and general wellbeing of the community.
• To provide patients with innovative, practical therapy solutions to maximize functional gains.
• To educate, support, and encourage patients and their families in a collaborative environment. (Udwin & Talbert, 2014)

Goals of Experiential Component

• To develop scholarship by synthesizing current literature on pediatric neuroplasticity, reflex integration, and martial arts and arguing the use of martial arts in pediatric occupational therapy services.
• To establish clinical excellence in pediatrics by applying literature on reflex integration and martial arts into clinical practice.
• To develop an innovative and versatile, pediatric martial arts program appropriate for clinic, classroom, and home settings.
• To serve clients by increasing accessibility of martial arts practice for children with special needs.
• To demonstrate leadership by sharing martial arts program with clients and their stakeholders.

Needs Assessment

• Seventeen caregivers of pediatric clients (age M=6.39 years; SD=1.76) at Sprocket Therapy Solutions completed an eight item survey regarding their child’s occupational therapy home program.
• Reported participation in child’s OT home program were as follows: 47% participated two to three times a week, 29% participated once a week, 12% participated daily, and 12% participated every two weeks.
• Clients’ caregivers compared how they were currently receiving resources regarding their child’s home program to how they preferred to receive resources regarding child’s home program.

Neuroplasticity and Central Nervous System Development

• Neuroplasticity is influenced by age, duration, environment, experiences, and intensity of experiences (Ayres, 1973, 2005; Cioni, Inguglito, & Sagandurra, 2016; Kolb & Gibb, 2014; Mundkur, 2005). Using a bottom-up approach, Taylor & Trotts’s (1992) pyramid of Central Nervous System development simplifies the relationship between experience and neuroplasticity (Williams & Shellenberger, 1994).

Reflex Integration

• During central nervous system development, primitive reflexes are inhibited by voluntary control in form of transitional reflexes and postural reactions (Chinello, Gangia, & Valenza, 2016; Goddard, 2004, 2005; Kobesova & Kolar, 2014; Zafeiriou, 2004).
• Primitive reflexes reach full inhibition in typically developing children by three and one half years (Goddard, 2005); however, primitive reflexes may not be inhibited and postural reactions may not fully mature within that expected timeframe (Chinello, Gangi, & Valenza, 2016).
• Children with unintegrated primitive reflexes or undeveloped postural reactions are often delayed in motor planning and higher level functioning (Chinello, Gangi, & Valenza, 2016; Goddard, 2004; Goddard Blythe, 2004; Taylor & Trot, 1991 as cited in Williams & Shellenberger, 1996).
• Reflex integration programs address reflexes in children with neurodevelopmental disabilities using ground-based movements to override preexisting movement patterns, but are not occupation based and can be difficult for parents to replicate at home (Ayres, 2005; Gertz, 2007; Goddard, 2005; Goddard Blythe, 2012; Konicarova & Bob, 2012; Sarnat, 2003; Taylor & Trot, 1991 as cited in Williams & Shellenberger, 1996; Zafeiriou, Tsikoulas, Kremenopoulos, & Kontopoulos, 1998).
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Outcomes and Artifacts of Work Products

Products Completed during Experiential Component:

• Scoping literature review arguing the use of martial arts as a tool for reflex integration.
• Needs assessment data report, summarizing results from caregiver needs assessment.
• Community resource handout, organized by neighborhood, listing local martial arts schools receptive to teaching children with special needs.
• Martial arts flashcard program, including:
  - Forty-five martial arts technique flashcards, outlined with simple steps and pictures, with ideas to grade up and grade down techniques.
  - Ten activity flashcards using adapted martial arts techniques to address STNR, ATNR, TLR, Moro, and Spinal Galant reflexes.

Examples from Martial Arts Program

Example of martial arts technique flashcard. Illustrated by Natalie Udwin.

Example of reflex integration activity flashcard. Illustrated by Natalie Udwin.