Exploring the Therapeutic Value of Martial Arts for Neurodevelopmental Disabilities

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Bottom Line Up Front

• Executive function (EF) appears to be key in the relationship between martial arts and improvement in those with neurodevelopmental disabilities (NDs)/Autism Spectrum Disorder (ASD)

• EF deficits in those with NDs are near identical to areas of EF improvement in exercise studies

• Physical activity of therapeutic value for those with NDs/ASD, via effects on EF, is likely activity featuring sequential patterns/ordered movements.
Martial Arts and Functional Health

• Martial Arts can be helpful for those with disabilities
  • Rehabilitative effects
  • Adaptive outcomes

• Working w/Adaptive Martial Arts Association & Kentucky Inclusive Health Collaborative to develop national guidance
Martial Arts and Functional Health

- Exercise improves aspects of mental processes:
  - Anxiety, Depression, & Mood
  - Think/Feel/Do

- VIA dopamine, serotonin, & noradrenaline pathways
Martial Arts Impacts Psychological Function

- Parents/teachers/trainers/scholars note those practicing martial arts improve beyond physical fitness:
  - Anxiety/depression/mood
  - Social/behavioral/adaptive
  - Self-control
  - Impulsivity/hyperactivity
Martial Arts Impacts Psychological Function

• Parents/teachers/trainers/scholars note those practicing martial arts improve beyond physical fitness:
  • Communication
  • Focus
  • Self-esteem
  • Academic performance
  • Attention
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Key Role for Executive Function

- Executive function (EF) aids planning and engagement in:
  - Goal-directed activities
  - Sequenced behavior
  - Cognitive flexibility
  - Inhibitory control
  - Effective working memory with distractions

- Disabilities displaying EF deficits and their impact(s) include, but are not limited to...
Disabilities Displaying EF Deficits

• Anxiety & Depression
• Neurodevelopmental disabilities: ADHD, ASD, disruptive behavior disorder(s), varied intellectual disabilities
• Varied cognitive disabilities and dysfunction
Disabilities Displaying EF Deficits

• Cerebral palsy
• Self-regulation deficits
• Language skills/reading/math/
• Other learning disabilities
Exercise-related benefits for executive function in healthy youth

Higher cognitive benefits in those with decreased executive function

Higher cognitive benefit in males vs. females

Improved cognitive control/appropriate allocation of attentional resources

Improved brain/neural connectivity

Cognitive impairment and decreased executive function

Higher prevalence/symptom severity in males vs. females

Impairment of cognitive control/inappropriate allocation of attentional resources

Brain/neural underconnectivity

ASD, ADHD, Communication Disorder, Intellectual Disabilities, Specific Learning Disorder
Insights from Autism Fitness

FITNESS IS A LIFE SKILL! --> Critical need for long-term fitness development in autistic youth

Youth with ASD have:
- Lower motivation towards physical activity
- Often overlooked gross & fine motor skill deficits
- Limited access to appropriate, tailored fitness

Use/acquisition of basic activities, then sequencing:
- Grab Ball Complex
- Hurdle Step-Overs
- Med Ball Throws/Slams
- Resistance Band Rotations
- Ball Tap Complex
- Bear Crawls
- "Scramble" X-cise
- Star Jumps
Expanding the Aperture...

• From Martial Arts, Dance, Autism Fitness, and Adaptive Climbing
  • Virtual instruction fails those with NDs
  • Let’s go live!
  • Patience for progression
Expanding the Aperture...

• From Martial Arts, Dance, Autism Fitness, and Adaptive Climbing
  • Solo to social
  • Less to more
  • Repetition: Create, repeat, master, extend
  • Generalized adaptations
An eye towards...

Promoting:
• Function
• Fitness
• Fun

With:
• Family
• Friends

For better, more independent futures

The International Classification of Functioning, Health and Disability (ICF) 2001

Health Condition

FITNESS

FUNCTION

FRIENDSHIPS

FAMILY FACTORS

FUN
Questions for Feedback

• #1: What other sequenced physical activities might you suggest for future research?

• #2: Have you seen, in your research, practice, or experience, impacts from the pandemic that might deserve our teams’ research attention?

• #3: Would you be interested in receiving a copy of our initial adaptive martial arts guidance for distribution, sharing, and provision of feedback?

THANK YOU!