Muscle-ship: The Often Overlooked Foundational Element of Performance Technique

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I. Background

- It is estimated that the preparation of a professional musician requires thousands (10,000) of hours of training.
- This training involves the development of coordinated actions between the eyes, brain, arms, hands, and fingers. (Bi-manual Technique)
- Over time, these actions become imprinted muscular templates that respond to specific stimuli.
- It is the process of MAPPING these muscular actions into the brain that occupy most teaching and practice time during the first several years of instruction.

II. Physical Injury Statistics

- All musicians, regardless of age, are susceptible to injury.
- The ICSOM survey revealed that 82% of the professional musicians polled had a medical problem related to musical performance and 76% reported that the injury severely affected their performance severely enough for them to miss 2 weeks of the season.
- String players had the highest overall rate of injury at 66% as compared to 48% of woodwind players and 32% of brass players.
- Overall performance injury percentages for string instrumentalists by gender were 72% for women and 62% for men.
- Analysis of the specific types in injury revealed that string players were most likely to have problems in the shoulder, neck, lower back, and left arm, wrist and hand. And, each gender is more susceptible to injury based on their unique physiology.
- Studies with young performers as young as age 8revealed that the incidence rate was the same or higher than the professional population.
- When comparing the overall rates of injury between a student and professional population there are specific unique causal factors that can be identified with the adolescent age group. There are physical, emotional, and social elements to consider. These are:

  - underlying physical conditions such as asthma
  - underlying mental health conditions such as depression, anxiety, etc . . .
  - lack of time management skills that lead to overuse

- lack of muscle development in particular areas of the body and poor body awareness
- poor basic training
- rapid bone growth
- psycho-social aspects of peer relationships
- hearing or vision issues
- the tendency for many adolescents to be limited in their conceptual thought process
- poor impulse control
- popular culture messages and social media
- environmental stress [lack of routine, financial insecurity, impact of COVID, etc . . .]
- overstimulation

- People aged 18 to 25 (22% of the US Population) have these basic health issues:

    + Mental Disorders
    + Substance Abuse (drugs, alcohol, tobacco, etc . . .)
    + Lack of Nutrition and Weight Problems
    + Sexually Transmitted Disease
    + Pregnancy
    + Homelessness and Academic Problems and Leaving School
    + Homicide and Suicide
    + Motor Vehicle Collision

- Additional studies with adolescents proved that the overall rate of injury was approximately 68% for females and 47% for males with the large string instrument population exhibiting the highest rate overall at 78%. Differences in physiology, muscle mass, development and coordination all contribute to the situation.

III. Conclusions

- Injuries are inadvertently "designed" into our pedagogical practice because:

    - risk factors (for injury) may be present long before a musician enters the professional performance environment, we have no mechanism to screen for them

    - the most substantive problem or problems may have started in the first years of performance preparation and we don't notice until the problem is debilitating

    - instrumental pedagogy as a body of knowledge does not specifically address muscular issues but rather subsumes them in the related musical or technical information and some of what is out there is NOT accurate to the sciences . . .
    - we have no mechanism to evaluate the physical process by which musicians develop their performance skills (no defined discrete skills, no physical screening, and teachers who have no training in physiology), for us they are the same

    - many very fine performers and teachers are "natural" players and they just perform very well so they lack expertise in solving physical issues.

- we also don't know what muscles do what and how they interact in healthy musicians and most of us have NO TRAINING in the area and often pedagogical materials have the science WRONG

- we subsume "form" (outward appearance) in technique, but really these are two different elements (and we have no accurate vocabulary for description). Often musical issues are manifest from Incorrect or inappropriate physical set up and muscular understanding.

- most of the data we do have is research on injured musicians and we have NEVER studied those players who perform well

- we don't have a musical "wellness" culture or any real prevention mechanism

- there is little information about teaching in the studio setting since it is one area that has virtually no research base so approaches, routines, and practice strategies have not been investigated.

- when a student is unsuccessful with a teacher it is often assumed that the student is the issue when it may be that the teacher does not have the tools to assist that student with their issues

- Instrumental performance has a rich history of "master teachers" but very little real evidence of what good teaching really is from the muscular perspective

IV. Muscle-ship in Music

- We as musicians use our muscular structure to create performance technique

- Many aspects of technique and performance are more dominated by physical stamina than musical acumen

- Training (the Action of TEACHING a particular skill or behavior) is the KEY
  [Practice is the actual "application" of the skill . . .]

- Training routines are based on sound understanding of how the body works and what is required for performance on a stringed instrument

- Some Key Motor Development Principles for String Instrument Instruction are

  - Muscle development is closely related to growth
    a. bones grow first
    b. weak upper body structure
  - Abdomen muscles are responsible for much of what the arms do
  - The overall health and FITNESS of the performer factors into performance ability
  - Warming up and stretching is critical to muscular health.
  - EXTENSIVE guided repetition is necessary for accurate muscular mapping
  - Muscles work in pairs or groups of pairs, principle of BALANCE
  - When a person exceeds their muscular limit or potential injury is likely

V. Ramifications for Performers and Instructors

- The Majority of Issues can be successfully managed by adjusting your approach:

  FOCUS ON BUILDING HABITS

  A HABIT IS A ROUTINE OR PRACTICE PERFORMED REGULARLY AND/OR AN AUTOMATICE RESPONSE TO A SPECIFIC SITUATION

- Many "performers" acquire their basic MUSCULAR VOCABULARY in the first few years of instruction so many injury causing behaviors can be traced back to this stage in their career. And, many students are in poor physical condition. So:

  + *REVIEW FUNDAMENTALS SUCH AS <u>POSTURE</u>, BREATHING, ETC... <u>EVERYDAY</u> TO BUILD MUSCULAR HABITS*

  + *GO OVER PRACTICE STRATEGIES SO THAT STUDENTS KNOW WHAT TO DO WHEN THEY GO HOME*

  + *HAVE STUDENTS ENGAGE IN LEARNING HOW THEY MOVE AND WHAT IT FEELS LIKE, THEY SHOULD BE VOCAL ABOUT HOW WHEN THINGS "FEEL" OFF*

  + *SUPPORT THEIR HEALTHY HABITS (SLEEP, NUTRITION, EXERCISE, STRESS MANAGEMENT, PLANNING, SOCIAL MEDIA RESTRAINT, ETC . . .)*

  + *HAVE STUDENTS WORK ON DEVELOPING PRACTICE ROUTINES AND DEVELOP STRATEGIES FOR PROBLEM SOLVING SO THEY ARE ACTIVELY INVOLVED IN THEIR OWN DEVELOPMENT*

- With appropriate training it should be possible for all "trainers" to anticipate a student's risk factors and work though them.

  + *CAREFULLY SCAFFOLD ACTIVITIES SO THAT STUDENTS DEVELOP SKILLS IN A PROGRESSIVE MANNER.*

  + *GRADUALLY INCREASE DURATION AS STUDENTS ARE ABLE.*

  + *DO NOT PUSH STIUDENTS TO EXHAUSTION AS THAT THEN LEADS TO THE DEVELOPMENT OF POOR HABITS. FATIGUE CAUSES POOR MECHANICS.*

  + *DO NOT ASSUME THAT ALL FATIGUE IS "PHYSICAL" . . . SKILLED MOVEMENT COMES FROM THE BRAIN*

  + *THE RULE IS TRAIN/PLAY HARD FOR A SHORT TIME AND THEN DO A REST/RESTORE ACTIVITY. WHEN RECOVERED GO BACK TO TRAINING/PLAYING.*

  + *PLAN FOR "EXTREME" SITUATIONS LIKE FESTIVALS ETC . . .*

  + *TEACH STRESS REDUCTION TECHNIQUES SUCH AS 4 X 4 BREATHING, MINDFULNESS, MEDITATION, ETC . . .*

  + *TAKE CARE OF YOURSELF AND MODEL THAT IN CLASS*

- TRAINING is PLANNED

  MOTOR LEARNING IS A PROCESS WHERE SKILLED BEHAVIORS ARE LEARNED AND IT IS ONLY WHEN WE SEE "PERMANENT" CHANGE DO WE ASSUME THE SKILL IS "LEARNED"

  WE NEED TO RE-THINK OUR STRUCTURES AND DEVELOP SOLID CONSISTENT ROUTINES THAT PROGRESS EACH DAY WITH EXPANSION - THIS IN TURN WILL BECOME A "HABIT"

- It is never to early to start revamping your TRAINING protocol. Here are a few basic resources to assist:

Resources for Training and Planning

Bruser, M. (1999). The Art of Practicing: A Guide to Making Music for the Heart. New York, NY: Crown Publishers.

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Cornett, V. (2019). The Mindful Musician: Mental Skills for Peak Performance. New York. NY: Oxford University Press.

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Weiss, S. (1996). The Anatomy Book for Musicians: A Guide to Understanding Performance Related Muscle Pain. Glenview, IL: Muscle Dynamics.

Mattes, A. (1995). Activated Isolated Stretching. Sarasota, FL: Aaron Mattes.

Norris, R. (1993). The Musician's Survival Manual: A Guide to Preventing and Treating Injuries in Instrumentalists. St. Louis, MO: MMB Publishing

Paull, B. & Harrison, C. (1997). The Athletic Musician: A Guide to Playing Without Pain. Lanham, MD: The Scarecrow Press.

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Additional Resources for Reference

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Larsson, L. , Baum, J. , Mudholkar, G. , and Killoa, G. (1993). Nature and Impact of Musculoskeletal Problems in a Population of Musicians. Medical Problems of Performing Artists, 8, 73-76.

Lippmann, H. (1991). A Fresh Look at Overuse Syndrome in Musical Performers: Is "Overuse" Overused ? Medical Problems of Performing Artists, 6, 57-60.

Lockwood, A. (1988). Medical Problems in Secondary School-Aged Musicians. Medical Problems of Performing Artists, 3, 129-132.

Manchester, R. (1997). Musculoskeletal Problems of Adolescent Instrumentalists. Medical Problems of Performing Artists, 12, 72-74.

Middlestadt, S. and Fishbein, M. (1989). The Prevalence of Severe Musculoskeletal Problems Among Male and Female Symphony Orchestra String Players. Medical Problems of Performing Artists, 4, 41-48.

Palac, J. (1992). Violin Bowing Technique: An analysis of Contemporary Pedagogical Literature According to Principles of Human Movement. Medical Problems of Performing Artists, 7, 30-34.

Sataloff, R. (Ed.). (1998). Performing Arts Medicine (2nd ed.). San Diego, CA: Singular Publishing Group.

Shoup, D. (1995). Survey of Performance-related Problems among High School and Junior High School Musicians. Medical Problems of Performing Artists, 10, 100-105.

Sklaire, M. (1997). Performing Arts Medicine: Pediatric and Adolescent Medical Aspects. Medical Problems of Performing Artists, 12, 75-78.

Smith, D. (1992). Medical Problems of Orchestral Musicians According to Age and Stage of Career. Medical Problems of Performing Artists, 7, 132-134.