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Instrumental Pedagogy
August 23, 2021

Kohut Chapter II

Neuromuscular Physiology

Muscular System: Relates to neuromuscular function through body movement. Includes skeletal, smooth, and cardiac muscles. Kohut states this is the most often observed in teaching and I agree. Much of instrumental playing requires that we use the body and use it in specific, carefully monitored motions to make desired results. As teachers, we likely start instruction with posture and physical set up in order to play an instrument (put this hand here, that foot there), and continue that trend until motions are smooth. As players, we are constantly moving and before even making a sound we lift the viola to the shoulder, bend the thumb beneath the stick, and curve the left and right hands.

Neuromuscular Coordination: Harmony between the nervous and muscular systems. In teaching, I first thought of this harmony as learning 'ease' but the more I think on neuromuscular coordination, I interpret it more as teaching communication between the brain and body. Getting the hands to move together, then separately, then together or independently to a steady pulse. Overall, strengthening that communication between the brain and the muscles so that messages come across in less and less time. As a player, I feel we use this coordination to achieve ease. For an early player, moving the fourth finger independently is strenuous. Over time, the motion becomes much easier as the communication strengthens. For a more advanced player we can think of the coordination of moving the bow from small to larger amounts to serve a phrase and how that motion might take extremely conscious effort at first, and then little or none in time.

The Human Brain: "…the most highly organized and most complexly organized matter in the universe" (Eccles, 23). In teaching, we must recognize the complexities of the brain as a reminder of each student's individuality and unique selves. Teachers should always be mindful of

what the student may or may not be perceiving. As a player, I see the brain's complexities as an opportunity for endless exploration with myself and music.

Information Processing: Perception and the process of the brain interpreting stimuli. What stimuli can we produce to help our student's perceive what we want them to perceive? As teachers, we might need to be very careful on how we address this part of learning and provide stimuli that doesn't overwhelm or mislead the student. As performers at a higher level, we might need to carefully decide which stimuli we can use to continually better our playing.

Decision-Executive Stage: The process of stimuli being interpreted and organized as neural commands. This stage makes me think of how one might recognize and interpret certain symbols to understand a fuller meaning. A very simple example being hearing "no" and stopping, and a musical example an "f" marked in music meaning 'forte'. I think there are many symbols we can use in teaching to engage this process. Motions, shortened phrases, imagery, or other anchors as shortcuts to represent a command. My improvisation class drastically changed my idea of what music can be. With this in mind and regards to this stage, the possible messages from stimuli are endless. A patter of rain and I think of my bow bouncing to imitate it, a touch of a soft towel and I remember to use soft weight in the string. I think artists also flip this process and recall stimuli to direct our playing: "Play like you're angry!"

Motor-Output Stage: The body working together to create a motion. As players and teachers, we must always be mindful that no one muscle or part of the body moves on its own. It is a whole organism making motions.

Voluntary Functions: Body movements that require conscious effort. The very beginning stages of learning and playing take an exhausting amount of conscious effort. One is always thinking about exactly where to place each part of the body in relation to the instrument.

Involuntary Functions: Bodily functions that happen with subconscious, or very little effort. As teachers, we carefully repeat exercises with our students so that skills like the instrument position become involuntary. It is also important to note that in observing a student, one might want to be very wary of anything that is involuntary for a student. Involuntary functions in playing are a huge benefit as long as they serve the music.

Reflex Actions: Actions that are essentially involuntary. There are inherited reflexes and conditioned reflexes. We seek to create conditioned reflexes as teachers and performers. Some examples in playing that come to mind are straightening the wrist when placing the left hand,

and curving the thumb underneath the bow. They are both motions that I can not help but naturally do. There are some instances - especially in new music - where I have to fight these reflexes to achieve something different.

Sensory System: Responsible for telling the body to stop or start and is a large part in how we adapt with our environment. The sensory system receives both external and internal information. There is a lot of opportunity for sensory system training in teaching: "Listen for this, feel that, see how this…, etc." If we direct the senses, we can guide the student on how to respond when they hear, feel, or see something. The sensory system is highly developed as a performer. On a multi-sensory level, I know if I am playing a particular work with a wind instrument solo, then my playing changes to accommodate for balance. On something simpler, I know if I feel tightness in my thumb, I am working too hard.

External Feedback: Information that comes from external senses: tactile, visual, and audible. I see a sort of fun in presenting a skill through each of these senses. The benefit could mean a thorough understanding for the student. It could also mean engaging multiple learning styles if you are a group or classroom teacher. In playing, I see the same benefit. Let us think of this bow stroke in visual, kinesthetic, and auditory venues. This allows a full-circle approach to the stroke as as skill and its role.

Knowledge of Results: Primary feedback that is used in trial-and-error practice. I love to engage students, no matter what age, in their perception of playing. "Did your scroll stay parallel to to the floor?" "Did your pitch match mine?" I believe we ask the same questions as performers in the practice room. This primary feedback can be tricky though, because we want to avoid vagueness in our evaluation. It is not good or bad. It is: did it happen or not. As long as this feedback is both informative and objective, I think it can be powerful.

Knowledge of Progress: Accumulated knowledge of results to inform progress. A number of successful trials means we are creating neuromuscular coordination, which creates skill. Some students are not able to see this progress and as teachers, we can use tools (like practice charts) for the student to visualize their progress. I think it is important to show this progress to our students and know which students might not respond to visualization of progress. I have to remind myself of progress often in the practice room. Currently, I have two new solo pieces on my plate and I feel like I will never get them to the point of performance. I have to stop and remind myself of

the many other times I have felt this way and also remind myself that comparable pieces have been worked to performance level in the past.

Internal Feedback: Awareness without external feedback. Two types of internal feedback: kinesthesis and vestibular mechanism. Kinesthesis could be experienced while closing the eyes during instrument play. You would have your ears and sense of touch to give you a sense of where you are on your instrument. Vestibular mechanism is the body's way of balancing and would help you not fall over while playing with the eyes closed. We can use both sides of this sensory system to guide our students to self reliance. If we train this internal feedback, they would be able to make progress alone. I often close my eyes in practice to get more detail from my ears. I have also been engaging my vestibular mechanism during active rest as part of my Alexander Technique assignments. It has flowed quite easily into practice. An awareness of one part of my body turns into an awareness of the whole body and how it can be better balanced to support my playing.