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The use of Neuro Emotional Technique with competitive rowers: A case series

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Abstract

Introduction: Power has been shown to consistently predict rowing performance, yet traditional methods to improve power may negatively impact performance when coupled with endurance training. Neuro Emotional Technique (NET) has been found to reduce stress and anxiety, which are also known to impair performance. The aim of this prospective case series was to describe how NET was used with competitive rowers, and to report any changes in average power output following the intervention.

Clinical Features: Seven elite rowers were tested using the Max Power Test, one week before and one week after a session of NET. Five of athletes performed better following the NET intervention, while two athletes performed worse.

Discussion: Many factors may have contributed to the changes in power output that these athletes experienced. Since this study was a case series and only a small sample was used, it lacked a comparison group. Therefore, no inferences or generalizations can be made. The changes seen may not be directly attributed to the NET intervention, but may the result of other factors, such as learning, normal training effects, or assessment bias. The primary limitations of this study include its qualitative design (i.e. a case report), and the appropriateness / usefulness of its primary outcome measure, the Max Power Test.

Conclusion: This case series demonstrates one plausible use of NET with athletes, however, a randomized, controlled trial is needed to determine its effectiveness before causality can be inferred.

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Introduction

Success in the sport of rowing depends upon many factors, including skill, timing, balance, endurance and power.[1-5] If an athlete can improve even one of these factors by merely a few percentage points, over 2000 meters, it may have a significant impact on the outcome of a race.

In the drive phase of the rowing cycle, athletes push with their legs while pulling with their arms and lower back which requires both muscular power and endurance.[6] Prior research has shown that the single best predictor of rowing performance is bilateral leg power.[6-10] Moreover, optimal rowing performance requires a *consistent* power output over time.[4] Since muscular power is the application of force (i.e. strength) over time,[11] optimal power requires a balance between strength and speed (see Fig 1). Traditionally, resistance training is used to develop strength; however, recent studies have shown that concurrent resistance and endurance training may compromise gains in strength and power.[9,12,13] Therefore, an alternative method of optimizing consistent power output would be beneficial.

Additionally, it is known that stress has adverse effects on sports performance,[14-18] and that stress can be responsible for increased muscle tension,[19] thereby reducing muscle efficiency. Therefore, it is hypothesized that if an athlete's level of stress can be reduced, muscle efficiency will improve, which may result in improved muscle power output. NET has been shown to be effective in reducing stress and anxiety,[20-22] therefore it is speculated that NET may enhance power output as well.

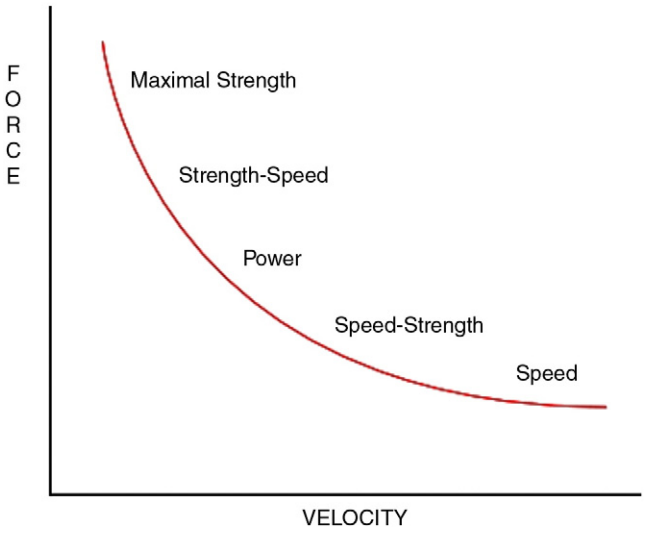


Fig 1. Force-velocity curve. (Adapted with permisision from McArdle and Katch.[11]) (Color version of figure is available online.)

The aim of this report is to describe how NET was used with rowing athletes and to report effect on short term rowing performance, specifically power output.

Clinical series

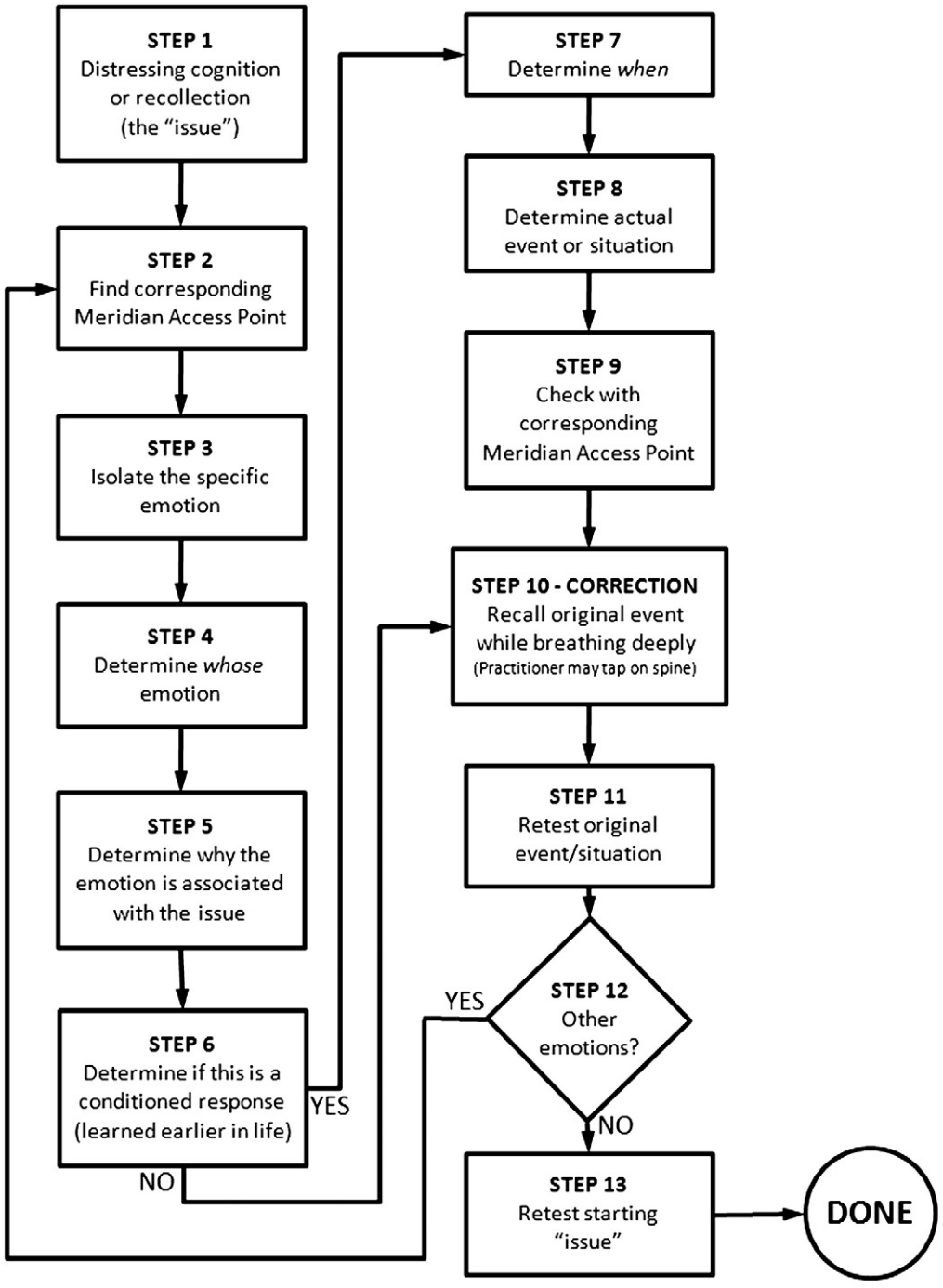
Seven national-level rowers volunteered for this prospective case series. Each athlete received a Participant Information Sheet and signed an Informed Consent form, all in accordance with recognized ethical standards in sport and exercise science research.[23-25] Each athlete gave consent to be included in this case series. In addition, they agreed not to alter their training program or any other lifestyle factors during the time of their participation. The primary outcome measure used in this study was the Max Power Test, and no other outcomes were measured.

One week before the intervention, each athlete performed a series of four Max Power Tests on the rowing ergometer to establish a baseline. The Max Power Test is a test frequently used by rowing coaches to assess the power of a rower's stroke, and is recorded in Watts, or Watts/kg (i.e. watts per kilogram of body weight). During the Max Power Test, performed on a rowing ergometer, the athlete pulls as hard as possible while the coach watches the display of Watts. The athlete pulls until the Watts (W) reaches a maximum level and then progressively diminishes, and the maximum Watts (W) achieved is recorded. One test normally takes less than 30 seconds to perform, and usually consists of 10 strokes or less. This test was chosen because of its familiarity within the rowing community and also because of its simplicity.[26-28] An increase in power is usually only accomplished using specific training methods (e.g. plyometrics or resistance training) over an extended period of time (e.g. weeks to months),[29,30] therefore it is presumed that the test-retest reliability of the Max Power Test would be sufficient, although no specific study was found to support this.

All pre- and post-intervention testing was performed using the same ergometer, a Concept II Ergometer Model C (Concept2, Inc., Morrisville, VT), at the same time of day (early evening). The drag setting was set consistently to 130. A qualified rowing coach conducted all tests and recorded all results. The ergometer display was out of view of the athlete being tested during the testing and athletes were not told their scores between testing. The athletes had one minute's rest

between each of the four tests. Within one week after testing, each athlete was given a single 30-minute session of NET by the same certified NET practitioner. All NET sessions were done at the boathouse where the athletes trained and where the testing was done. The NET sessions focused on the feeling of maximizing power, the feeling of optimizing performance, and on any awareness of pain, fatigue, or failure in any body part. Subsequently, within one week of the NET intervention, the athletes performed another four Max Power Tests in an identical manner as the pre-intervention tests.

NET, a relatively new stress-reduction technique, is considered an alternative intervention,[31] whose aim is



Reference: Walker, S., Neuro Emotional Technique™ Certification Manual. 2004, Encinitas, CA: Neuro Emotional Technique, Inc.

Fig 2. Neuro Emotional Technique Protocol Flowchart.[32]

Table 1 Max Power Test results (Watts) for each athlete

		Pre-intervention				Post-intervention				Change in mean score	
Rower	Gender	Total (4 tests)	High	Low	Mean	Total (4 tests)	High	Low	Mean	Watts	%
1	F	1778	447	443	444.50	1791	456	433	447.75	3.25	0.73
2	F	1676	423	416	419.00	1696	431	418	424.00	5.00	1.19
3	F	1347	348	321	336.75	1337	354	317	334.25	−2.50	−0.74
4	F	1763	445	438	440.75	1879	483	458	469.75	29.00	6.58
5	F	1335	342	321	333.75	1330	342	326	332.50	−1.25	−0.37
6	M	2991	756	735	747.75	3185	807	785	796.25	48.50	6.49
7	M	3858	987	938	964.50	3915	986	971	978.75	14.25	1.48

F, Female; *M*, Male; *High*, Highest Score; *Low*, Lowest Score.

to remove neurological abnormalities which have a specified physiopathological pattern.[32] It is based on principles of a number of different health disciplines such as chiropractic, psychology/psychotherapy, and traditional Chinese medicine.[32] However, it is dissimilar to more conventional approaches, like cognitive behavioural therapy, in that aside from addressing a patient's cognitions, internal dialogue and behaviours in response to a distressing experience, NET predominantly focuses on *emotions* about the experience. The NET procedure involves a series of well-defined steps (see Fig 2), commencing with a physiological response to an emotional stimulus.[32]

Once a physiological reaction is found, the practitioner helps the patient identify the specific emotion using the emotion-meridian relationship from Traditional Chinese Medicine.[33] How the specific emotion fits the distressing situation is then explored, and sometimes a parallel set of circumstances is identified earlier in life as well. While visualizing the emotionally distressing situation, and holding specific body points associated with the emotion, a mechanical force is applied to specific sequence of spinal levels during a full respiratory cycle. Following the intervention, patients frequently report feeling subjective relief.[31]

The power output of five out of the seven athletes increased following the NET session compared to before. Change in average scores of these five athletes ranged from +3.3 to +48.5 W, or +0.7% to +6.58%. The two athletes whose performance decreased had a change in power of –1.25 and –2.5 W, or –0.37% and –0.74%. See Table 1 for a summary of each athlete's results.

Discussion

There are many factors that lead to the success of a rowing crew, and power output of individual rowers is critical. Improving muscle power is generally thought to occur after a significant period of specific training methods.[11] With no change in their training routine, the average power output of five of these seven athletes increased by an average of 20 W (3.29%) following one session of NET (see Table 1). This increase may be attributed to a variety of factors, only one of which may be the NET intervention. The improvements may also be attributed to individual participant factors, such as learning to perform the test better, or to being more relaxed during the second phase of testing, or to any normal weight training that may have occurred between testing, or to other variables. There were also two athletes whose average power scores decreased by an average of 1.88 W (0.56%) following the NET. This decrease may also be attributed to a variety of factors, including the NET intervention, or other participant-specific factors such as fatigue or stress the day of testing.

On the other hand, the changes noted may not be due to any of these participant factors, but to the inherent weaknesses of the primary outcome measure (i.e. the Max Power Test), discussed below, or to other assessment biases. Since this study was a case series, and thus lacked a controlled condition and adequate power, no direct cause-and-effect relationship can be established, and caution must be applied when making inferences and generalizations.[34]

Stress has been correlated to a deterioration in athletic performance,[11] and rowing performance in particular.[35] Reducing stress/anxiety may in turn have the effect of reducing general muscle tension, which would improve general muscle function.[19] It is speculated that NET may be effective at improving power output in some athletes because NET is thought to reduce stress and anxiety.[32,36] See Fig 3.

In addition, in the chosen setting, it was difficult to hold a number of variables constant during the

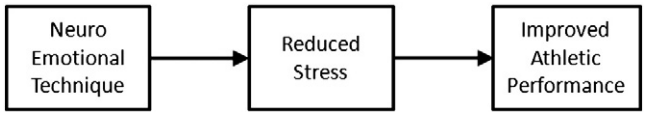


Fig 3. Simplified Speculation of NET Impact on Athletic Performance.

intervention sessions. Since all sessions occurred in the boathouse and gym area where these and other athletes trained, and not in a clinic setting, there were the occasional disturbances. The degree of privacy and comfort during intervention sessions was highly variable. Also, this study occurred in the winter, and the temperatures in the boathouse during sessions were often uncomfortably cold.

One other factor that may have had an impact on outcomes was that the practitioner was completely unknown to the athletes. During NET sessions personal and private memories are often evoked, and insufficient rapport and trust in the practitioner may diminish the therapeutic effect. In this way, this study greatly diverged from a normal therapeutic setting, where rapport would be established prior to giving the intervention. This important aspect should be seriously considered when designing future effectiveness research.

Limitations

Because this is a case series, it is not appropriate to make generalizations of these results to all rowing athletes. Another significant limitation of this study is the usefulness and appropriateness of the chosen primary outcome measure, the Max Power Test, to predict rowing performance. Subsequent to the completion of data collection of this case series, other studies found that the reliability of changes in power output during ergometer rowing for distances less than 2000m is debatable, with the per cent standard error of the mean increasing as distance rowed decreased.[37] Therefore, since the distance rowed by each athlete in this case series was less than one hundred meters, the error in the measured power output may have been significant. Another study found only a mild correlation between a 15-sec all out row (similar to the Max Power Test) and a 2000m time trial,[38] which further challenges the legitimacy of our chosen primary outcome measure. Therefore, for future research, instead of the Max Power Test, it is suggested that a more appropriate measure of power or rowing performance be used. The 2000m ergometer time trial is recommended, which has demonstrated excellent test-retest reliability,[39,40] and which is thought to better correlate with actual rowing performance.[38,41] Other assessment measures that future researchers may want to consider as an alternative to the Max Power Test are the 1-rep-max (1RM) leg press, a measure of lower body strength,[9] or the vertical jump, a measure of lower body power.[6,30]

Another limitation of this study is that other factors that may impact performance were not monitored, such as caffeine consumption[42] and menstruation.[43] In addition, stress and anxiety levels themselves were also not measured, which would have strengthened this study considerably.

It is noted that whilst the average power scores seemed to increase considerably for some of the athletes, their high scores did not increase to a great extent. If this was the case, then this would suggest a *greater consistency in power output*, which has been shown to be important to optimize rowing performance,[4] and therefore would be highly beneficial.

Since there have been no other studies to date published on the use of NET to enhance rowing performance, this case series is an important first step, and it may encourage others to undertake clinical trials to test the effectiveness of NET.

Conclusion

Optimal rowing performance is complex and multidimensional in nature, of which power is one important component. This case series is novel because it demonstrates a unique way to address athletic performance. Future clinical trials must be conducted to investigate the role of NET in enhancing power output of rowers.

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