



## THE EFFECTS OF MENTAL TOUGHNESS TRAINING ON ATHLETIC COPING SKILLS AND SHOOTING EFFECTIVENESS FOR NATIONAL HANDBALL PLAYERS

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### Abstract

*Aim.* Mental toughness' is probably one of the most used but least understood terms used by sporting communities globally and, in particular, by their media. The purpose of this study was to explore the effects of mental toughness training on Athletic Coping Skills and shooting effectiveness in male handball players.

*Methods.* The sample was comprised of 18 male handball players [age,  $20.76 \pm 2.65$  years; height,  $169.88 \pm 7.08$  cm; weight,  $66.16 \pm 8.14$  kg; training experience,  $6.41 \pm 2.34$  years (mean  $\pm$  SD)]. Who all members in handball team – Zagazig university (2012). The subjects divided into two groups. The experimental group ( $n= 10$ ) participated in mental toughness training program. Three times weekly. To eight weeks. The control group ( $n= 8$ ) participated in the traditional program only. All of the participants completed the MTQ48 (Clough et al., 2002), an instrument used to measure mental toughness. Responses to the 48 items are based on a 5-point Likert scale ranging from (1) strongly disagree to (5) strongly agree. And the Athletic Coping Skills Inventory – 28 (ACIS-28; Smith, et al., 1995) is a 28-item scale measuring seven classes of sport-specific psychological coping skills including coping with adversity, peaking under pressure, goal setting and mental preparation, concentration; freedom from worry, confidence and achievement motivation, and coach ability. Individuals were asked to respond to each statement by indicating how often they experience different situations using a 4 point scale, 0 = almost never to 3 = almost always). Each subscale consists of four items that are averaged to provide a subscale range of 0 to 3. Additionally, the seven subscales are summed and averaged to provide a total personal coping resource score. Performance effectiveness was determined by success or failure in the shooting.

*Results.* The results of this analysis revealed significant differences between two groups in the mental toughness factors and athletics coping skill factors and Performance effectiveness of the experimental group.

*Conclusion.* The findings indicated that the implication of this research for coaches working with mentally tough athletes is that to match athlete preferences.

*Keywords:* MTQ48, ACSI-28, shooting, handball.

### Introduction

The sport is generally considered an activity with pronounced emphasis on the physical side. But it is widely accepted that sport performance is also influenced in great measure by psychological factors. An optimal sport performance involves just as much, if not more, a mental component than a physical one (Craciun, 2009).

Sport psychology is an interdisciplinary science that draws on knowledge from many related fields including biomechanics, physiology, kinesiology and training. It involves the study of how psychological factors affect performance and how participation in sport and exercise affect psychological and physical factors. (R.S. Weinberg, & D. Gould, 2010). In addition to instruction and training of psychological skills for performance improvement, applied sport psychology may include work with athletes, coaches, and parents regarding injury, rehabilitation, communication, team building, and career transitions.

Weinberg and Forlenza (2010) indicated that

the best athletes need to be both physically and mentally tough in order to produce successful in competition.

Stress is considered by some to be an inherent feature of competitive youth sport (Anshel & Delany, 2001). Stress refers to the process by which individuals perceive and respond to particular events, termed stressors, which they appraise as challenging or threatening (Lazarus & Folkman, 1984). In addition to stress relating directly to the sport organization (e.g. Selection pressures, personal performance), athletes may concurrently be experiencing academic, employment or social stressors (Dugdale, Eklund, & Gordon, 2002; Woodman & Hardy, 2001).

Psychological research is often an integral component of the multidimensional process of athletic training. The results of psychological studies not only enable the development of theoretical frameworks describing and explaining the structure of a number of psychological factors, but can also be used to identify the determinants of sports results (Maciej et al.,

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2012).

Mental toughness has often been examined in relation to various psychological skills and self-regulation, as these factors seem to be related.

Mental toughness is a subject of intense study in Egypt, and especially as it pertains to handball game. Studies that addressed mental toughness in the field of sports have focused only on the psychological performance inventory originally published by Loehr (1986). There are multiple definitions of mental toughness due to lack of understanding of the nature of mental rigidity and uncertainty as to what are the most important determinants of a solid mental status. In the field of sports, mental toughness has a large impact on the achievement of sporting excellence. According to Daniel and Sandy (2011), mental toughness is probably one of the most used, but least understood term in the field of sports psychology.

Many sport psychologists work in field with athletes on psychological skill development, but interviews and reports suggest that many coaches and athletes remain reluctant to use sport psychology (Craciun, 2009).

Mental toughness is a very important determinant of success for handball athletes. However, there is a lack of literature addressing the role of mental toughness training in handball performance. Hence, the purpose of this study was to explore the effects of mental toughness training on Athletic Coping Skills and shooting effectiveness in male handball players.

## Methods

### Experimental Approach to the Problem

Two groups (experimental and control), performed a pre and post training designed intervention in which MTQ48, ACIS-28 and shooting test were recorded. The experimental group trained one hour per day 3 times a week on mental toughness training besides the handball training for eight weeks. The control group continued their normal training, while the experimental group completed a mental toughness training program to see whether this type of training modality would have a positive or negative or no effect on ACIS-28 and shooting performance.

### Participants

The sample was comprised of 18 male handball players [age,  $20.76 \pm 2.65$  years; height,  $169.88 \pm 7.08$  cm; weight,  $66.16 \pm 8.14$  kg; training experience,  $6.41 \pm 2.34$  years (mean  $\pm$  SD)]. Who all members in handball team – Zagazig university (2012). The subjects divided into two groups. The experimental group ( $n= 10$ ) participated in mental toughness training program. Three times weekly. To eight weeks. The control group ( $n= 8$ ) participated in the traditional program only.

### Instrumentation

#### Mental Toughness Questionnaire – 48

The MTQ48 (Clough et al., 2002) is a 48-item questionnaire that includes challenge, commitment, control, and confidence subscales. The control and confidence subscales are each comprised of 2 factors (emotional and life control, and interpersonal and self-confidence, respectively). Responses to items within the subscales were provided via a 5-point Likert-type scale ranging from 1 (strongly agree) to 5 (strongly disagree). An example of an item is as follows: "I am generally confident in my own abilities". The questionnaire inquires about mental toughness in general; participants were asked to consider the items in relation to their main sport. Scores were summed across all items to obtain a mental toughness score.

The inventory has been used in multiple studies (Horsburgh et al., 2009; Nicholls et al., 2008; Clough et al., 2002; Crust and Azadi, 2010).

#### Athletic Coping Skills Inventory – 28

The Athletic Coping Skills Inventory – 28 (ACIS-28; Smith, et al. 1995) is a 28-item scale measuring seven classes of sport-specific psychological coping skills including coping with adversity, peaking under pressure, goal setting and mental preparation, concentration; freedom from worry, confidence and achievement motivation, and coach ability. Individuals were asked to respond to each statement by indicating how often they experience different situations using a 4 point scale (e.g., I put a lot of pressure on myself by worrying about how I will perform", 0 = almost never to 3 = almost always). Each subscale consists of four items that are averaged to provide a subscale range of 0 to 3. Additionally, the seven subscales are summed and averaged to provide a total personal coping resource score. Psychometric properties of the scale have been demonstrated via confirmatory factor analyses and preliminary evidence for construct and predictive validity have been found with high school athletes and professional baseball players (Smith, et al. 1995).

#### Shooting effectiveness

The shooting effectiveness was measured via committee which contain from 3 members, the player performed jump shoot (5) trial and account the percentage of correct shoot and wrong shoot.

#### Mental toughness training Protocol

The 8-week in-season training program consisted of 5 axes.

1. Winning is not your sole responsibility
2. You are not just a handball player
3. You cannot control everything
4. Staying positive is not enough
5. Stuff happens

#### Statistical Analysis

All statistical analyses were calculated by the SPSS statistical package. The results are reported as means and standard deviations (SD). Differences between two groups were reported as mean difference  $\pm$  95% confidence intervals (mean difference  $\pm$  95%

CI). Student's t-test for independent samples was used to determine the differences in psychological

parameters between the two groups. The  $p < 0.05$  was considered as statistically significant

### Results

Table 1. Age, anthropometric characteristics and training experience of the group (mean  $\pm$  SD).

| Variables | N  | Age [years]      | Weight [kg]      | Height [cm]       | Training experience |
|-----------|----|------------------|------------------|-------------------|---------------------|
|           | 17 | 20.76 $\pm$ 2.65 | 66.16 $\pm$ 8.14 | 169.88 $\pm$ 7.08 | 6.41 $\pm$ 2.34     |

Table 1 shows the age, anthropometric characteristics and training experience of the subjects. No significant differences were observed for the subjects

Table 2. MTQ48, ACIS-28 and Shooting effectiveness Scores for two groups

| Variables                             | Control         |                 |          | Experimental    |                 |        | T sign between groups |
|---------------------------------------|-----------------|-----------------|----------|-----------------|-----------------|--------|-----------------------|
|                                       | Pre             | Post            | T sign   | Pre             | Post            | T sign |                       |
| Challenge                             | 2.15 $\pm$ 0.19 | 2.19 $\pm$ 0.22 | Not sign | 2.19 $\pm$ 0.16 | 3.71 $\pm$ 0.32 | Sign   | Sign                  |
| Commitment                            | 2.39 $\pm$ 0.12 | 3.42 $\pm$ 0.14 | Not sign | 2.33 $\pm$ 0.17 | 3.63 $\pm$ 0.44 | Sign   | Sign                  |
| Emotional Control                     | 3.01 $\pm$ 0.22 | 3.07 $\pm$ 0.26 | Not sign | 3.08 $\pm$ 0.11 | 3.68 $\pm$ 0.51 | Sign   | Sign                  |
| Life Control                          | 2.66 $\pm$ 0.23 | 2.65 $\pm$ 0.36 | Not sign | 2.62 $\pm$ 0.16 | 3.24 $\pm$ 0.5  | Sign   | Sign                  |
| Confidence in Abilities               | 2.78 $\pm$ 0.31 | 2.80 $\pm$ 0.34 | Not sign | 2.81 $\pm$ 0.28 | 3.64 $\pm$ 0.39 | Sign   | Sign                  |
| Interpersonal Confidence              | 2.69 $\pm$ 0.28 | 2.72 $\pm$ 0.15 | Not sign | 2.73 $\pm$ 0.26 | 3.75 $\pm$ 0.32 | Sign   | Sign                  |
| Overall Mental Toughness              | 2.81 $\pm$ 0.27 | 3.36 $\pm$ 0.33 | Not sign | 2.78 $\pm$ 0.30 | 3.63 $\pm$ 0.29 | Sign   | Sign                  |
| coping with adversity                 | 2.66 $\pm$ 0.39 | 2.70 $\pm$ 0.31 | Not sign | 2.66 $\pm$ 0.39 | 3.71 $\pm$ 0.32 | Sign   | Sign                  |
| peaking under pressure                | 2.58 $\pm$ 0.32 | 2.57 $\pm$ 0.29 | Not sign | 2.67 $\pm$ 0.32 | 3.66 $\pm$ 0.39 | Sign   | Sign                  |
| goal setting and mental preparation   | 2.29 $\pm$ 0.22 | 2.33 $\pm$ 0.20 | Not sign | 2.25 $\pm$ 0.22 | 3.58 $\pm$ 0.32 | Sign   | Sign                  |
| Concentration                         | 2.19 $\pm$ 0.43 | 2.22 $\pm$ 0.34 | Not sign | 2.22 $\pm$ 0.21 | 3.29 $\pm$ 0.22 | Sign   | Sign                  |
| freedom from worry                    | 2.31 $\pm$ 0.41 | 2.30 $\pm$ 0.36 | Not sign | 2.33 $\pm$ 0.36 | 3.19 $\pm$ 0.43 | Sign   | Sign                  |
| confidence and achievement motivation | 2.42 $\pm$ 0.38 | 2.64 $\pm$ 0.39 | Not sign | 2.40 $\pm$ 0.39 | 3.31 $\pm$ 0.41 | Sign   | Sign                  |
| coachability                          | 2.36 $\pm$ 0.27 | 2.40 $\pm$ 0.28 | Not sign | 2.33 $\pm$ 0.24 | 3.62 $\pm$ 0.38 | Sign   | Sign                  |
| Shooting effectiveness                | 6.66 $\pm$ 0.55 | 7.23 $\pm$ 0.76 | Not sign | 6.59 $\pm$ 0.59 | 8.23 $\pm$ 0.27 | Sign   | Sign                  |

Data in Table 2 shows that there is a significant difference in overall mental toughness and certain athletics coping skills, between the pre- and post-training. Significant differences between the two groups in overall mental toughness and certain athletics coping skills, Confidence in Abilities are responsible for the difference observed.

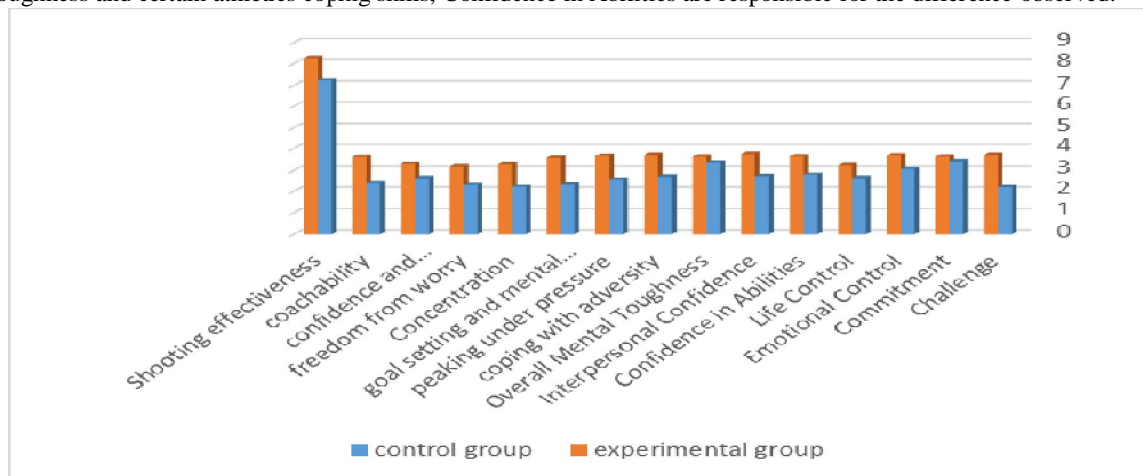


Fig I explain. MTQ48, ACIS-28 and Shooting effectiveness Scores between two groups

Table 3. Pearson Correlations between Shooting effectiveness and MTQ48, ACIS-28

| Factors                | Challenge | Commitment | Emotional Control | Life Control | Confidence in Abilities | Interpersonal Confidence | Overall Mental Toughness | Coping With adversity | Peaking under pressure | Goal setting and mental concentration | Concentration | Freedom from worry | Confidence and achievement motivation | Coachability |
|------------------------|-----------|------------|-------------------|--------------|-------------------------|--------------------------|--------------------------|-----------------------|------------------------|---------------------------------------|---------------|--------------------|---------------------------------------|--------------|
| Shooting effectiveness |           | 0.39*      | 0.61**            | 0.55**       | 0.59**                  | 0.64**                   | 0.69**                   | 0.71**                | 0.69**                 | 0.48*                                 | 0.55**        | 0.41*              | 0.73**                                | 0.67**       |

\* p 0.05

\*\* p 0.01

Data in Table 3 shows that significant correlations exist between shooting effectiveness and overall of mental toughness and coping strategies , as well as emotional control, confidence in abilities and interpersonal confidence.

### Discussion

The results of this study showed that the experimental group higher scores than the control group in mental toughness, athletics coping skills and shooting effectiveness. These results were revealed that mental toughness training effectively. In addition, the best shooting performance would be expected to be more mentally tough.

The main findings from this study were that the highest significant correlations between competition results and factors contributing to mental toughness were in interpersonal confidence and emotional control. Individuals who score high on interpersonal confidence tend to be more assertive, are less likely to be intimidated in social settings and are also better able to cope with difficult or awkward people. In addition, a high score in emotional control indicates that they are better able to control their emotions, to keep anxieties in check and are less likely to reveal their emotional state to other people.

Simon, et al. (2004) seen it the maximum level myself natural or sophisticated can access it, a gain endurance athletes compared to their competitors during athletic competition or training or way of life, and through the development of trust and stability under the pressure of focus.

John, et al. (2003) concluded that mental toughness is not the mentality of just a feature but also physical, emotional, mental toughness not possess the instinct to crush your competition or characterized by frosty, but they are concerned with access to the ideal maximum performance from your skills and your talent, regardless of the pressure of competition.

As national handball athlete, it is important to be aware of the mental and physical demands of competition and to be prepared to deal with them. These results confirmed that mental toughness is crucial to success in handball game, as it is not only immensely demanding physically, but also mentally.

Loehr (1982, 1986) emphasized that athletes and coaches felt that at least fifty percent of success is due to psychological factors that reflect mental toughness. Similarly, Gould, Hodge, Perterson, and Petlichkoff (1987) emphasized that coaches feel that mental toughness is important in achieving success, while Norris (1999) has emphasized the importance of mental toughness in developing champion athletes.

Ruiz and Hanin, (2004) concluded that the content of metaphors used by athletes to describe their emotional states was different prior to, during, and after performances, as well as across their best and worst competition performances. High action readiness was manifested in best performance situations, while low action readiness was reflected in worst performance situations.

A review of literature pointed to mental toughness as being one of the most important determinants of peak athletic performance. Gould, et al. (1987) reported that 82 percent of wrestling coaches ranked mental toughness as the primary quality associated with competitive success. Williams, et al. (1999) found that mental toughness might be more important in determining the outcome of a sporting event than factors such as speed and ability.

These findings are consistent with the non – handball game literature as well. For instance, some studies indicate that successful athletes coped with stress more effectively than non-successful athletes (Scanln, et al., 1991). Others have also demonstrated that anxiety, mood, stress, coping, and control collectively contributes to the prediction of performance (Robinson and Howe, 1987). Equally important are the psychological factors of the stress and coping paradigm that predict training outcomes and adherence. Indeed, one study used changes in mood as a measure to assess whether Olympic canoes became “stale” from too much training. These studies



point to the relevance of psychological factors in the training process.

Players who has the self-confidence has clear objectives seek to achieve high motivation, and able to deal with the negative energy. They cannot get rid of them for good and capable of transformation into positive energy during competitions, mental energy is the player changed and changed during competitions. Whether the players individually or with team sports as a group, and that this is due to many reasons lead to that a possible efficiency of the player or the player rival performance. or because they feel tired, whether physical or mental, or to the different approach between the players and the coach and the audience reactions from encourage or vilified, or for fear of the occurrence or recurrence of the injury, so it must be a trainer familiar with them and aware as well as for the player.

### Conclusion

The findings of this study indicated that mental toughness and athletics coping skills are related to performance success. Coaches working with athletes need to take these factors into account when preparing for competition.

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