

## Evaluation of Hand Grip Strength in Vegetarian and Non Vegetarian Table Tennis Players

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### Abstract

Aim of the present study was to find if diet had any substantial role in influencing the muscle strength and force in table tennis players. 183 table tennis players (right handed) were included (70 vegetarian, 113 non vegetarian) in whom hand grip strength was determined by spring type isometric hand grip dynamometer. When compared dominant hand had a significantly better grip strength when compared to non dominant hand. Although a positive co-relation was obtained when grip strength was compared in dominant hand among vegetarians and non- vegetarians it was not statistically significant. In conclusion a well planned vegetarian diet is recommended for an athlete because of its antioxidant properties.

**Key words:** Hand grip, Dynamometry, Diet, Antioxidants

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### Introduction

One of the racquet sports enjoyed by young and old population alike in India is table tennis. It is a sport which requires a good hand grip to hit a light weight ball to the opponent using special technique. Dominant arm is mainly used in the sport which involves flexor muscles of the arm and forearm. Since early 1900's hand grip strength has been used for evaluating muscular strength and force.<sup>1,2</sup> Gripping activity requires coordinated action of the muscles of the hand and forearm.<sup>3</sup> Hand is a grasping tool. When performing isometric hand grip, muscles involved are muscles of forearm and muscles of hypothenar eminence.<sup>4</sup> Few of the factors which mainly affect hand grip strength are diet, age, sex, lean body mass, height and weight.<sup>5</sup> Incel et al found that strength of dominant arm was higher<sup>6</sup> while Reikeras found no significant difference in grip strength of dominant and non-dominant hand.<sup>7</sup>

There are controversial reports regarding effect of diet on hand grip strength. In a study conducted by Hanne et al no significant differences were found between vegetarian and non-vegetarian athletes who performed isometric hand grip.<sup>8</sup> While most of the studies confirmed that diet had no significant role in physical fitness some studies in early 20<sup>th</sup> century found positive co- relation between well planned vegetarian diet and physical endurance.<sup>9</sup> Table tennis is a sport involving endurance.<sup>10</sup> The present study was

undertaken to determine if diet plays a role in performing isometric hand grip in table tennis players. Isometric hand grip was chosen as it is a simple and inexpensive method.

### Materials and Method

The present study was conducted in the department of Physiology SIMS and RC in between 9.00 a.m. and 11:00 a.m. after an informed consent one hour following a light breakfast. The procedure was explained to the subjects.

**Inclusion criteria:** 183 right handed male table tennis players in whom height and weight was matched in the age group of 20- 30 years were included in the study. Both vegetarian and non-vegetarian players were included in the study. Out of this group 70 were vegetarian and 113 were non vegetarian.

**Exclusion criteria:** Smoking, hypertension, on any medication, any acute or chronic illness. Ethical clearance was obtained from institutional ethical committee. Upper extremity strength can be assessed by using hand grip dynamometer. The same was used during this study. Test was conducted using isometric hand grip spring type dynamometer. Subjects were allowed to hold the instrument for some time before conducting the procedure in order to get familiarized with it. After a rest of 10 minutes subject held the dynamometer in the dominant hand. Using maximum effort the handles of the dynamometer were compressed. There are two pointers in the apparatus. After compression one pointer stays at zero while the other indicates maximum unit of the muscle strength. Test was performed three times with a gap of a minute. The entire procedure was repeated in the non-dominant hand after a 10 minute rest. The mean of the three readings was obtained.

## Results

Results obtained were tabulated and compared using paired sample test and independent samples test. p value <0.05 was considered as significant.

**Table 1: Comparison of hand grip strength in dominant and non-dominant hand in table tennis players using paired sample test**

	No. of players(n)	Mean ±SD
Dominant hand	183	29.63 ±9.31
Non dominant hand	183	27.01 ±10.74

Positive co relation was obtained when grip strength was compared between dominant and non-dominant hand.

**Table 2: Comparison of hand grip strength using paired sample test after obtaining paired difference**

Mean ±SD	p value
2.61 ±3.57	<0.05

p value <0.05 indicates that dominant hand is significantly having higher grip strength when compared to non-dominant hand.

**Table 3: Comparison of grip strength in dominant hand among vegetarian and non-vegetarian table tennis players using group statistics**

Diet	Number (n)	Mean ±SD
vegetarian	70	29.79 ±7.21
Non-vegetarian	113	27.68 ±8.92

A positive co- relation was obtained when hand grip strength was compared in dominant hand among vegetarians and non-vegetarian players.

**Table 4: Comparison of grip strength among vegetarians and non – vegetarians in whom independent sample test is done**

Mean ±SD	p value
-2.1143603±1.2030422	p>0.05 Not sig

p value<0.05 suggests that hand grip strength in dominant hand when compared among vegetarians and non-vegetarians was statistically not significant.

## Discussion

Main finding of the study was that the tension produced in the dominant hand is more than that of the non-dominant. This is in accordance with a study by Incel. Incel stated that hand grip strength is higher in right hand dominant than left hand dominant group. <sup>6</sup>

This could be attributed to the fact that overt physical activity over time causes an increase in number of actin and myosin filaments i.e. hyperplasia.

There is also an increase in the size of the individual muscle fibers. Muscle hypertrophies because of this. In addition enzyme systems which provide energy also increase. This stands good for glycolytic enzymes which are extremely necessary to supply energy for forceful muscle contraction on a short term basis.<sup>11</sup>

Hand grip when compared in the dominant hand in vegetarian and non-vegetarian table tennis players, no significant differences were observed in accordance with the study by Nieman et al.<sup>9</sup> A study by Cotes et al<sup>12</sup> and Hanne et al<sup>8</sup> showed no significant difference in hand grip strength among vegetarians and non-vegetarians. In contrast to our study Khanna et al, found a better endurance level in non-vegetarian female athletes compared to lacto and ovolactovegetarian female athletes.<sup>13</sup>

During any competitive game high oxygen consumption is present. The same leads to production of free radicles.<sup>14</sup> This is where vegetarian diet has a prominent role to play. When appropriately designed it provides carbohydrates for energy requirements. Current area of research also suggests the role of vegetarian diet by way of antioxidants. It is rich in ascorbic acid, tocopherol and beta carotene compared to non-vegetarian diet.<sup>15</sup> Many athletes are also following a vegetarian diet because of its benefits in reducing the incidence of chronic diseases.<sup>13</sup>

## Conclusion

Diet per se, has no significant role in determining the muscle strength in athletes. However considering its role in reducing oxidative stress another study can be formulated keeping this in mind, where a well planned vegetarian diet is consumed by athletes over years and then muscle strength can be compared

**Conflict of Interest:** None

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