

## Study on muscular preparation of middle school students during handball classes

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**Abstract:** The development of handball players force has an important role in driving action, the force being a limiting factor of technical executions. Not all methods taken from sports training can be addressed in physical education lessons, and those that are suitable to driving level of pupils, usually methods that are working with the training of children and juniors, should be chosen from the material base available to school and availability of pupils. Force can be trained successfully by using work front method having influence on the development of specific handball driving skills.

**Key word:** force, physical education, frontal work method, handball

### Introduction

The game of handball has experienced lately a rapidly evolving and we could say even spectacular. The level of performance achieved in the current stage, both internationally and local is very high and can not be achieved only by players whose performance capability is particularly high and rising. Art play area was greatly expanded.

Handball is a game characterized by a complexity of movements executed in conditions of changing speed and force, determined by collaboration between teammates and direct combat between opponents.[1]

There are new procedures that the professional handball player perform with high craftsmanship. It also enriched the individual and collective technique diversifying the solutions to different game situations. All this has implications for handball training model components, including the increase in the volume training.

Learning any techniques and its revaluation depends on the strength development. Playing an important role in all the acts and actions of the driving force is the limiting factor of technical execution, insufficient to prevent the development of efficiency and continuity of the movements, leading to delays in correct executions and fatigue affect the accuracy of gestures.

Force development is intended to increase the overall force ratios and provides technical support needed for performing force. Lack of proper support force can lead to the incorrect formation of technical skills.[2]

This quality largely determines the speed motor driving documents, helping to increase the number of repetitions and so the resistance. As conditional capacity, force has a high degree of training, the changes at this level leading to changes anatomical and physiological and so

stirring up major organic functions to improve system neuromuscular properties, so at students level to support specific effort physical education lessons, but also the educational activities.

The human body force (and not one that is a feature -order mechanical motion of any body) is the ability to make efforts to win, maintenance or disposal in a relation with internal or external strength by contraction of one to several muscle groups.[3]

In this paper we have tried to respond to the question if use working method compared to the development of frontal force through the circuit in groups, lead to significant differences between the two groups of students included in research and which are those?

Also which of the two methods contribute to capacity to work independently as a source of involving students in their preparation but also for permanent education through movement?

### Materials and methods

The experiment took place eight grades classes and included 60 students.

One class worked using the frontal force method and it was chosen randomly the eighth grade A consists of 13 boys and 17 girls, and class VIII B consists of 14 boys and 16 girls that worked using the workshop method. Along with school activities the student were advised to exercise in their free time the means that were included in lessons, explaining to them the need to continue the work to achieve a breakthrough in testing.

In February, the students were initially tested (IT) and in March both classes were finally tested (FT). Samples selected for assessing the subject progress are included in the National System of School Assessment in physical education and sport, namely: hanging arm tractions; pushes feet resting on the bench, pushes with hands resting on the bench, lifting bank with two hands

to the chest; simultaneous lifting the torso and legs, side lunges, three successive long jump from standstill, pushes with one foot resting on a fixed scale.

In preparing this paper, we used the following research methods:

- observation method by which I formed the guiding idea of the work that motivate the students to work independently is one of the keys to progress in line accumulations of force, insufficient school hours allocated to the program.
- method of studying the literature that I have built over the issue chosen and I remember in practice impossible to comply with methodological recommendations formulated by limiting the activity to the school schedule and the need to find real solutions to immediate compensation of these discrepancies between the

provisions of methodology and general time spent training students.

- Shaping method for applying two methods of instruction.
- method tests - used to evaluate student progress as a result of application of the two working methods specific to physical education student evaluation.
- statistical and mathematical method to calculate specific indicators -Use namely the arithmetic mean and its ratio to the reference tables.
- graphical method used to mimic representation of the recorded data.
- As a means of force development methods I used to eighth grade to A- 6 programs selected exercises in front of order 2 each, and the eighth grade B- him six circuits. Both classes have worked specific exercises for handball.

## Results

Table no. 1. VIIIth Class A - boys

| Name | Hanging arm tractions |      | Pushes feet resting on the bench |      | Simultaneous lifting the torso and legs horizontally |      | Side lunges |       | Three successive long jump from standstill |      |
|------|-----------------------|------|----------------------------------|------|------------------------------------------------------|------|-------------|-------|--------------------------------------------|------|
|      | I.T.                  | F.T. | I.T.                             | F.T. | I.T.                                                 | F.T. | I.T.        | F.T.  | I.T.                                       | F.T. |
| A.A. | 1                     | 5    | 20                               | 27   | 4                                                    | 18   | 9+12        | 24+24 | 5.65                                       | 5.80 |
| B.A  | 10                    | 12   | 13                               | 22   | 1                                                    | 10   | 6+3         | 22+18 | 5.80                                       | 6.00 |
| C.L  | 3                     | 7    | 28                               | 34   | 12                                                   | 22   | 11+15       | 26+26 | 5.00                                       | 5.40 |
| C.B  | 2                     | 6    | 10                               | 21   | 3                                                    | 15   | 9+12        | 25+25 | 5.90                                       | 6.00 |
| D.A  | 2                     | 5    | 20                               | 27   | 4                                                    | 16   | 8+10        | 24+24 | 4.10                                       | 5.10 |
| O.R  | 6                     | 9    | 20                               | 27   | 5                                                    | 18   | 10+10       | 24+24 | 6.10                                       | 6.20 |
| R.A  | 3                     | 7    | 15                               | 24   | 5                                                    | 18   | 7+8         | 23+23 | 3.80                                       | 5.10 |
| R.A  | 1                     | 5    | 9                                | 22   | 6                                                    | 19   | 7+7         | 23+24 | 5.20                                       | 5.70 |
| L.D  | 4                     | 7    | 20                               | 27   | 8                                                    | 21   | 14+14       | 26+26 | 6.20                                       | 6.30 |
| V.A  | 3                     | 7    | 25                               | 29   | 8                                                    | 20   | 14+12       | 24+24 | 4.10                                       | 5.10 |

Table no. 2. VIIIth Class B - boys

| Name | Hanging arm tractions |      | Pushes feet resting on the bench |      | Simultaneous lifting the torso and legs horizontally |      | Side lunges |       | Three successive long jump from standstill |      |
|------|-----------------------|------|----------------------------------|------|------------------------------------------------------|------|-------------|-------|--------------------------------------------|------|
|      | I.T.                  | F.T. | I.T.                             | F.T. | I.T.                                                 | F.T. | I.T.        | F.T.  | I.T.                                       | F.T. |
| B.A  | Medical relief        |      |                                  |      |                                                      |      |             |       |                                            |      |
| B.T  | 6                     | 6    | 18                               | 20   | 4                                                    | 8    | 16+10       | 18+12 | 5.40                                       | 5.50 |
| B.R  | 2                     | 3    | 18                               | 21   | 2                                                    | 6    | 8+12        | 10+13 | 5.35                                       | 5.40 |
| C.D  | 2                     | 4    | 20                               | 20   | 3                                                    | 5    | 7+6         | 10+11 | 4.10                                       | 4.80 |

|     |   |   |    |    |    |    |       |       |      |      |
|-----|---|---|----|----|----|----|-------|-------|------|------|
| D.R | 5 | 6 | 10 | 18 | 1  | 6  | 5+7   | 9+10  | 5.70 | 5.90 |
| J.A | 2 | 4 | 30 | 34 | 12 | 13 | 12+13 | 14+15 | 4.20 | 4.60 |
| M.A | 2 | 4 | 21 | 22 | 5  | 7  | 9+12  | 12+14 | 4.60 | 5.10 |
| P.O | 4 | 6 | 16 | 18 | 6  | 8  | 14+10 | 15+18 | 5.10 | 5.30 |
| P.R | 9 | 8 | 21 | 26 | 3  | 6  | 16+20 | 16+22 | 5.40 | 5.60 |
| S.A | 8 | 9 | 15 | 19 | 4  | 8  | 11+14 | 16+22 | 5.20 | 5.40 |

Table no. 3. VIIIth Class A – girls

| Nume | Pushes with hands resting on the bench |      | Lifting the bench with two hands from the chest |      | Lifting knees to the chest from hanging |      | Jumping over the gymnastic bench |      | Pushes with one foot resting on a fixed scale |       |
|------|----------------------------------------|------|-------------------------------------------------|------|-----------------------------------------|------|----------------------------------|------|-----------------------------------------------|-------|
|      | I.T.                                   | F.T. | I.T.                                            | F.T. | I.T.                                    | F.T. | I.T.                             | F.T. | I.T.                                          | F.T.  |
| B.A  | 2                                      | 6    | 7                                               | 15   | 10                                      | 16   | 6                                | 9    | 10+10                                         | 16+16 |
| B.O  | 3                                      | 8    | 9                                               | 18   | 9                                       | 14   | 9                                | 16   | 12+13                                         | 14+15 |
| C.E  | 2                                      | 8    | 11                                              | 18   | 12                                      | 21   | 7                                | 12   | 10+11                                         | 12+12 |
| E.C  | 10                                     | 11   | 13                                              | 19   | 18                                      | 23   | 20                               | 26   | 15+15                                         | 17+17 |
| G.A  | 3                                      | 6    | 12                                              | 21   | 16                                      | 20   | 15                               | 18   | 10+13                                         | 16+16 |
| I.A  | 4                                      | 9    | 10                                              | 22   | 11                                      | 15   | 8                                | 11   | 11+12                                         | 14+15 |
| M.I  | 4                                      | 8    | 18                                              | 24   | 14                                      | 18   | 7                                | 12   | 18+25                                         | 22+25 |
| M.R  | 2                                      | 7    | 11                                              | 16   | 20                                      | 24   | 5                                | 9    | 11+11                                         | 18+18 |
| N.A  | 4                                      | 6    | 9                                               | 18   | 12                                      | 19   | 6                                | 12   | 9+12                                          | 16+17 |
| P.D  | 6                                      | 8    | 12                                              | 17   | 11                                      | 15   | 7                                | 12   | 10+15                                         | 16+16 |
| P.A  | 4                                      | 9    | 10                                              | 15   | 9                                       | 16   | 11                               | 18   | 11+9                                          | 17+15 |
| R.R  | 15                                     | 17   | 15                                              | 18   | 20                                      | 24   | 13                               | 21   | 10+10                                         | 18+18 |
| R.M  | 5                                      | 7    | 11                                              | 21   | 14                                      | 18   | 10                               | 18   | 12+14                                         | 21+22 |
| Ş.D  | 3                                      | 7    | 21                                              | 24   | 17                                      | 21   | 8                                | 12   | 10+10                                         | 18+18 |
| T.A  | 4                                      | 6    | 20                                              | 24   | 15                                      | 19   | 16                               | 21   | 15+15                                         | 22+23 |
| T.I  | 2                                      | 6    | 11                                              | 17   | 15                                      | 18   | 21                               | 34   | 11+19                                         | 19+21 |
| V.M  | 10                                     | 12   | 20                                              | 27   | 20                                      | 24   | 22                               | 34   | 23+17                                         | 28+24 |

Table no. 4. VIIIth Class B –girls

| Nume | Pushes with hands resting on the bench |      | Lifting the bench with two hands from the chest |      | Lifting knees to the chest from hanging |      | Jumping over the gymnastic bench |      | Pushes with one foot resting on a fixed scale |       |
|------|----------------------------------------|------|-------------------------------------------------|------|-----------------------------------------|------|----------------------------------|------|-----------------------------------------------|-------|
|      | I.T.                                   | F.T. | I.T.                                            | F.T. | I.T.                                    | F.T. | I.T.                             | F.T. | I.T.                                          | F.T.  |
| B.I  | 8                                      | 9    | 4                                               | 6    | 4                                       | 8    | 9                                | 10   | 6+8                                           | 7+8   |
| B.M  | 3                                      | 5    | 4                                               | 8    | 10                                      | 12   | 3                                | 5    | 7+8                                           | 8+9   |
| C.C  | 10                                     | 10   | 10                                              | 12   | 10                                      | 12   | 25                               | 25   | 12+15                                         | 13+14 |
| C.S  | 2                                      | 4    | 6                                               | 8    | 5                                       | 7    | 8                                | 9    | 9+7                                           | 8+9   |
| C.D  | 4                                      | 4    | 6                                               | 7    | 10                                      | 11   | 9                                | 10   | 6+9                                           | 8+10  |
| D.A  | 4                                      | 5    | 3                                               | 4    | 8                                       | 10   | 2                                | 4    | 10+11                                         | 11+12 |
| D.D  | 2                                      | 4    | 6                                               | 6    | 7                                       | 9    | 9                                | 8    | 8+8                                           | 8+10  |
| H.E  | 4                                      | 5    | 9                                               | 8    | 10                                      | 10   | 12                               | 14   | 11+10                                         | 12+14 |

|       |    |    |    |    |    |    |    |    |       |       |
|-------|----|----|----|----|----|----|----|----|-------|-------|
| L.N   | 10 | 10 | 12 | 14 | 4  | 6  | 8  | 10 | 10+12 | 11+13 |
| M.I   | 5  | 7  | 6  | 7  | 4  | 5  | 14 | 16 | 9+11  | 10+11 |
| M.L   | 4  | 4  | 5  | 8  | 14 | 12 | 10 | 9  | 9+12  | 10+11 |
| P.I   | 5  | 6  | 10 | 12 | 6  | 9  | 7  | 9  | 8+10  | 10+14 |
| S.G   | 6  | 8  | 10 | 9  | 13 | 14 | 13 | 14 | 15+18 | 17+18 |
| Ş.A-M | 3  | 5  | 1  | 5  | 2  | 6  | 6  | 8  | 6+7   | 8+6   |
| Ş.M   | 2  | 4  | 2  | 4  | 4  | 6  | 4  | 9  | 7+10  | 8+10  |
| V.R   | 11 | 14 | 10 | 10 | 14 | 15 | 12 | 12 | 12+15 | 14+15 |

From the recorded data can be observed that the class where we opted for force development method by the frontal process, students performances increased with a higher progression grade than the class that was chosen for the process in circuit. So, although the initial testing performance classes start from close performances at the end of our pedagogical experiment series A, which has been working frontal achieved higher average front in all samples, even those that started slightly weaker.

Best results, highest progression is registered to force abdominal where progress rate of 12.7 repetitions, significant support our claims. Lower rate of progression to first test records or traction of 5.3, where the share of results is placed in a Gauss curve slightly by lower average performance, yet not one homogenous team, demonstrating and standard deviation, it being the only value over two units at final testing of the class.

Looking at this indicator we initial note heterogeneity collectives, both girls and boys, which was expected to new classes, students from different schools with not unitary previous training. For final testing at both collective note a relative homogenization samples with the series A share increased compared with series B which partly kept their cool though baseline average sample grade students performed in progression compared to initial testing.

As for the girls, the situation is similar, with a progression notice much lower compared to the series, which has been through the process circuit. We can notice than the first sample, which

pushes, unexpected progression is somewhat light compared with other samples progressions although they are not neglected.

What we notice to team class that worked on the front is it homogeneity in all samples. It seems that female students with good results were content with them, without further work, and those where results have been very poor, have progressed more, the average increase in place more under increases their value. For series B, the rate of progress of girls is very small, insignificant as their counterparts in the same class, boys are more likely to develop this quality driving interest.

Without neglecting the variable induced by our experiment, different methods of approaching the subject of the lesson should be remembered that the pupils which were formulated extra class tasks, to continue the work in their free time with the means recommended lessons, which as we can see, the students from class A, used its, showing some remarkable progression is that the pedagogical and methodological basis of the experience could not only achieve through the work ordered by the school program.

Sure, teamwork, students would have been beneficial for student from series B and from the perspective of quantitative accumulation and socialization, the development of interrelations between them. In reality, they were not organized, they don't found resources to spend a few minutes preferential for a sport activity, which is a key for reflection on the pedagogical approach of the issue.

Table no.5. Data from control samples specific to handball

| No. |   | Name | 30 m (s) |     | 10x30 m (s) |     | Dribbling |   | Pentasalt |    | Throwing the handball balls |    | ove in triangle |    | Cooper test 9" |      |
|-----|---|------|----------|-----|-------------|-----|-----------|---|-----------|----|-----------------------------|----|-----------------|----|----------------|------|
|     |   |      | 1        | 2   | 1           | 2   | 1         | 2 | 1         | 2  | 1                           | 2  | 1               | 2  | 1              | 2    |
| 1   | P | IL   | 4.7      | 4.6 | 4.9         | 4.7 | -         | - | 10.5      | 11 | 28                          | 28 | 21              | 20 | 1600           | 1650 |
| 2   | P | CC   | 4.7      | 4.6 | 4.8         | 4.7 | -         | - | 10        | 10 | 29                          | 31 | 21              | 20 | 1650           | 1700 |

|    |         |    |      |      |      |      |     |     |      |      |      |      |    |       |      |      |
|----|---------|----|------|------|------|------|-----|-----|------|------|------|------|----|-------|------|------|
| 3  | IS      | CO | 4.5  | 4.6  | 4.9  | 4.7  | 7.0 | 7.0 | 10.5 | 10.5 | 30   | 30   | 21 | 21    | 1700 | 1750 |
| 4  | ID      | DS | 4.7  | 4.4  | 4.7  | 4.x  | 6.9 | 6.8 | 12   | 12.5 | 31   | 32   | 20 | 19    | 1700 | 1750 |
| 5  | ES      | PA | 4.4  | 4.3  | 4.6  | 4.4  | 6.8 | 6.8 | 11   | 11.5 | 30   | 30.5 | 20 | 19    | 1850 | 1900 |
| 6  | ED      | MD | 4.5  | 4.4  | 4.5  | 4.4  | 6.8 | 6.7 | 11   | 11   | 29   | 30   | 19 | 18    | 1800 | 1900 |
| 7  | ED      | IV | 4.6  | 4.5  | 4.8  | 4.6  | 6.8 | 6.8 | 10.5 | 11   | 29   | 30   | 20 | 19    | 1900 | 2000 |
| 8  | C       | FM | 4.5  | 4.5  | 4.6  | 4.7  | 6.9 | 6.7 | 10.5 | 11   | 28   | 29   | 21 | 21    | 1800 | 2000 |
| 9  | PV      | MF | 4.4  | 4.4  | 4.7  | 4.6  | 6.8 | 6.7 | 11   | 12   | 30   | 31   | 20 | 20    | 1900 | 2010 |
| 10 | PV      | CB | 4.4  | 4.3  | 4.8  | 4.6  | 6.8 | 6.6 | 11   | 11.5 | 30   | 30   | 19 | 18    | 1950 | 1900 |
| 11 | C       | CC | 4.6  | 4.5  | 4.7  | 4.6  | 6.9 | 6.7 | 12   | 11.5 | 31   | 31   | 19 | 19    | 1850 | 1800 |
| 12 | C       | OC | 4.5  | 4.5  | 4.7  | 4.6  | 7.0 | 6.8 | 11.5 | 11   | 32   | 32   | 20 | 19    | 1900 | 2000 |
| 13 | ES      | AO | 4.4  | 4.4  | 4.6  | 4.5  | 7.1 | 6.9 | 10   | 10   | 28   | 29   | 21 | 20    | 1950 | 2000 |
| 14 | ID      | DO | 4.5  | 4.3  | 4.7  | 4.3  | 6.8 | 6.7 | 10   | 10   | 31   | 31   | 19 | 19    | 1900 | 2000 |
|    | Average |    | 4.52 | 4.45 | 4.45 | 4.58 | 6.9 | 6.7 | 11.6 | 11.1 | 29.7 | 30.3 | 20 | 19.40 | 1820 | 1890 |

The battery of tests used to assess driving ability as we have seen, includes 7 tests which highlights the physical attributes and the development of specific handball driving skills.

The results are reported in the model proposed by Romanian Handball Federation (RHF).[4] Average samples results: dribbling among stakes, pentasalt, Cooper test is over the scale of the Federation.

Goalkeepers recorded a higher average (+0.15) over the scale RHF, home to 30m flat feet, and +0.1 to 10x30m), and results over those of the decasalt + 3m FRH; throwing handball ball + 3m and + 100m Cooper test.

Inters players have better outcomes than "motor model" testing both I and the second on 6 of the 7 samples tested. The 10x30m sample result is the same as that recommended by the RHF.

At the extreme, pivot center and testing results are better at second testing, particularly at the Cooper test + 110m. results below the motor pattern is recorded as if to 30m and 10x30 m at goalkeepers.

#### Conclusions

Force development approach in physical education lessons need careful decision, given that the number of hours allocated to this discipline is not enough to comply with recommendations of specific methodology built on scientific knowledge, on the valuable experimental foundations .

Not all methods taken from sports training can be addressed in physical education lessons and those that are suitable to driving level of pupils, usually methods that are used for working with the training of children and juniors should be chosen from the base material available to school and students available.

This study shows that using the method of frontal work was which yielded better results, but success is based on independent work of students.

In frontal work approach it is necessary a number of materials needed enough for staff working, even if the exercises can be chosen and free , option that took into account of individual student activity.

Without promoting frontal work method as the best way of working for quality driving force, we suggest, however, that the exercises of content is in the format of the students, successfully retain them and applicator of the idea of lifelong learning through sport and for sport.

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