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ЕЖЕМЕСЯЧНЫЙ НАУЧНЫЙ ЖУРНАЛ

Медицинские новости Грузии
საქართველოს სამედიცინო სიახლენი

GEORGIAN MEDICAL NEWS

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GMN: Georgian Medical News is peer-reviewed, published monthly journal committed to promoting the science and art of medicine and the betterment of public health, published by the GMN Editorial Board since 1994. GMN carries original scientific articles on medicine, biology and pharmacy, which are of experimental, theoretical and practical character; publishes original research, reviews, commentaries, editorials, essays, medical news, and correspondence in English and Russian.

GMN is indexed in MEDLINE, SCOPUS, PubMed and VINITI Russian Academy of Sciences. The full text content is available through EBSCO databases.

GMN: Медицинские новости Грузии - ежемесячный рецензируемый научный журнал, издаётся Редакционной коллегией с 1994 года на русском и английском языках в целях поддержки медицинской науки и улучшения здравоохранения. В журнале публикуются оригинальные научные статьи в области медицины, биологии и фармации, статьи обзорного характера, научные сообщения, новости медицины и здравоохранения. Журнал индексируется в MEDLINE, отражён в базе данных SCOPUS, PubMed и ВИНТИ РАН. Полнотекстовые статьи журнала доступны через БД EBSCO.

GMN: Georgian Medical News – საქართველოს სამედიცინო სიახლენი – არის ყოველთვიური სამეცნიერო სამედიცინო რეცენზირებადი ჟურნალი, გამოიცემა 1994 წლიდან, წარმოადგენს სარედაქციო კოლეგიისა და აშშ-ის მეცნიერების, განათლების, ინდუსტრიის, ხელოვნებისა და ბუნებისმეტყველების საერთაშორისო აკადემიის ერთობლივ გამოცემას. GMN-ში რუსულ და ინგლისურ ენებზე ქვეყნდება ექსპერიმენტული, თეორიული და პრაქტიკული ხასიათის ორიგინალური სამეცნიერო სტატიები მედიცინის, ბიოლოგიისა და ფარმაციის სფეროში, მიმოხილვითი ხასიათის სტატიები.

ჟურნალი ინდექსირებულია MEDLINE-ის საერთაშორისო სისტემაში, ასახულია SCOPUS-ის, PubMed-ის და ВИНТИ РАН-ის მონაცემთა ბაზებში. სტატიების სრული ტექსტი ხელმისაწვდომია EBSCO-ს მონაცემთა ბაზებიდან.

WEBSITE

www.geomednews.com

К СВЕДЕНИЮ АВТОРОВ!

При направлении статьи в редакцию необходимо соблюдать следующие правила:

1. Статья должна быть представлена в двух экземплярах, на русском или английском языках, напечатанная через **полтора интервала на одной стороне стандартного листа с шириной левого поля в три сантиметра**. Используемый компьютерный шрифт для текста на русском и английском языках - **Times New Roman (Кириллица)**, для текста на грузинском языке следует использовать **AcadNusx**. Размер шрифта - **12**. К рукописи, напечатанной на компьютере, должен быть приложен CD со статьей.

2. Размер статьи должен быть не менее десяти и не более двадцати страниц машинописи, включая указатель литературы и резюме на английском, русском и грузинском языках.

3. В статье должны быть освещены актуальность данного материала, методы и результаты исследования и их обсуждение.

При представлении в печать научных экспериментальных работ авторы должны указывать вид и количество экспериментальных животных, применявшиеся методы обезболивания и усыпления (в ходе острых опытов).

4. К статье должны быть приложены краткое (на полстраницы) резюме на английском, русском и грузинском языках (включающее следующие разделы: цель исследования, материал и методы, результаты и заключение) и список ключевых слов (key words).

5. Таблицы необходимо представлять в печатной форме. Фотокопии не принимаются. **Все цифровые, итоговые и процентные данные в таблицах должны соответствовать таковым в тексте статьи**. Таблицы и графики должны быть озаглавлены.

6. Фотографии должны быть контрастными, фотокопии с рентгенограмм - в позитивном изображении. Рисунки, чертежи и диаграммы следует озаглавить, пронумеровать и вставить в соответствующее место текста **в tiff формате**.

В подписях к микрофотографиям следует указывать степень увеличения через окуляр или объектив и метод окраски или импрегнации срезов.

7. Фамилии отечественных авторов приводятся в оригинальной транскрипции.

8. При оформлении и направлении статей в журнал МНГ просим авторов соблюдать правила, изложенные в «Единых требованиях к рукописям, представляемым в биомедицинские журналы», принятых Международным комитетом редакторов медицинских журналов - <http://www.spinesurgery.ru/files/publish.pdf> и http://www.nlm.nih.gov/bsd/uniform_requirements.html В конце каждой оригинальной статьи приводится библиографический список. В список литературы включаются все материалы, на которые имеются ссылки в тексте. Список составляется в алфавитном порядке и нумеруется. Литературный источник приводится на языке оригинала. В списке литературы сначала приводятся работы, написанные знаками грузинского алфавита, затем кириллицей и латиницей. Ссылки на цитируемые работы в тексте статьи даются в квадратных скобках в виде номера, соответствующего номеру данной работы в списке литературы. Большинство цитированных источников должны быть за последние 5-7 лет.

9. Для получения права на публикацию статья должна иметь от руководителя работы или учреждения визу и сопроводительное отношение, написанные или напечатанные на бланке и заверенные подписью и печатью.

10. В конце статьи должны быть подписи всех авторов, полностью приведены их фамилии, имена и отчества, указаны служебный и домашний номера телефонов и адреса или иные координаты. Количество авторов (соавторов) не должно превышать пяти человек.

11. Редакция оставляет за собой право сокращать и исправлять статьи. Корректур авторам не высылаются, вся работа и сверка проводится по авторскому оригиналу.

12. Недопустимо направление в редакцию работ, представленных к печати в иных издательствах или опубликованных в других изданиях.

При нарушении указанных правил статьи не рассматриваются.

REQUIREMENTS

Please note, materials submitted to the Editorial Office Staff are supposed to meet the following requirements:

1. Articles must be provided with a double copy, in English or Russian languages and typed or computer-printed on a single side of standard typing paper, with the left margin of 3 centimeters width, and 1.5 spacing between the lines, typeface - **Times New Roman (Cyrillic)**, print size - 12 (referring to Georgian and Russian materials). With computer-printed texts please enclose a CD carrying the same file titled with Latin symbols.

2. Size of the article, including index and resume in English, Russian and Georgian languages must be at least 10 pages and not exceed the limit of 20 pages of typed or computer-printed text.

3. Submitted material must include a coverage of a topical subject, research methods, results, and review.

Authors of the scientific-research works must indicate the number of experimental biological species drawn in, list the employed methods of anesthetization and soporific means used during acute tests.

4. Articles must have a short (half page) abstract in English, Russian and Georgian (including the following sections: aim of study, material and methods, results and conclusions) and a list of key words.

5. Tables must be presented in an original typed or computer-printed form, instead of a photocopied version. **Numbers, totals, percentile data on the tables must coincide with those in the texts of the articles.** Tables and graphs must be headed.

6. Photographs are required to be contrasted and must be submitted with doubles. Please number each photograph with a pencil on its back, indicate author's name, title of the article (short version), and mark out its top and bottom parts. Drawings must be accurate, drafts and diagrams drawn in Indian ink (or black ink). Photocopies of the X-ray photographs must be presented in a positive image in **tiff format**.

Accurately numbered subtitles for each illustration must be listed on a separate sheet of paper. In the subtitles for the microphotographs please indicate the ocular and objective lens magnification power, method of coloring or impregnation of the microscopic sections (preparations).

7. Please indicate last names, first and middle initials of the native authors, present names and initials of the foreign authors in the transcription of the original language, enclose in parenthesis corresponding number under which the author is listed in the reference materials.

8. Please follow guidance offered to authors by The International Committee of Medical Journal Editors guidance in its Uniform Requirements for Manuscripts Submitted to Biomedical Journals publication available online at: http://www.nlm.nih.gov/bsd/uniform_requirements.html
http://www.icmje.org/urm_full.pdf

In GMN style for each work cited in the text, a bibliographic reference is given, and this is located at the end of the article under the title "References". All references cited in the text must be listed. The list of references should be arranged alphabetically and then numbered. References are numbered in the text [numbers in square brackets] and in the reference list and numbers are repeated throughout the text as needed. The bibliographic description is given in the language of publication (citations in Georgian script are followed by Cyrillic and Latin).

9. To obtain the rights of publication articles must be accompanied by a visa from the project instructor or the establishment, where the work has been performed, and a reference letter, both written or typed on a special signed form, certified by a stamp or a seal.

10. Articles must be signed by all of the authors at the end, and they must be provided with a list of full names, office and home phone numbers and addresses or other non-office locations where the authors could be reached. The number of the authors (co-authors) must not exceed the limit of 5 people.

11. Editorial Staff reserves the rights to cut down in size and correct the articles. Proof-sheets are not sent out to the authors. The entire editorial and collation work is performed according to the author's original text.

12. Sending in the works that have already been assigned to the press by other Editorial Staffs or have been printed by other publishers is not permissible.

**Articles that Fail to Meet the Aforementioned
Requirements are not Assigned to be Reviewed.**

ავტორთა საქურაღებოლ!

რედაქციაში სტატიის წარმოდგენისას საჭიროა დაიცვათ შემდეგი წესები:

1. სტატია უნდა წარმოადგინოთ 2 ცალად, რუსულ ან ინგლისურ ენებზე დაბეჭდილი სტანდარტული ფურცლის 1 გვერდზე, 3 სმ სიგანის მარცხენა ველისა და სტრიქონებს შორის 1,5 ინტერვალის დაცვით. გამოყენებული კომპიუტერული შრიფტი რუსულ და ინგლისურენოვან ტექსტებში - **Times New Roman (Кириллица)**, ხოლო ქართულენოვან ტექსტში საჭიროა გამოვიყენოთ **AcadNusx**. შრიფტის ზომა – 12. სტატიას თან უნდა ახლდეს CD სტატიით.

2. სტატიის მოცულობა არ უნდა შეადგენდეს 10 გვერდზე ნაკლებს და 20 გვერდზე მეტს ლიტერატურის სიის და რეზიუმეების (ინგლისურ, რუსულ და ქართულ ენებზე) ჩათვლით.

3. სტატიაში საჭიროა გაშუქდეს: საკითხის აქტუალობა; კვლევის მიზანი; საკვლევი მასალა და გამოყენებული მეთოდები; მიღებული შედეგები და მათი განსჯა. ექსპერიმენტული ხასიათის სტატიების წარმოდგენისას ავტორებმა უნდა მიუთითონ საექსპერიმენტო ცხოველების სახეობა და რაოდენობა; გაუტკივარებისა და დაძინების მეთოდები (მწვავე ცდების პირობებში).

4. სტატიას თან უნდა ახლდეს რეზიუმე ინგლისურ, რუსულ და ქართულ ენებზე არანაკლებ ნახევარი გვერდის მოცულობისა (სათაურის, ავტორების, დაწესებულების მითითებით და უნდა შეიცავდეს შემდეგ განყოფილებებს: მიზანი, მასალა და მეთოდები, შედეგები და დასკვნები; ტექსტუალური ნაწილი არ უნდა იყოს 15 სტრიქონზე ნაკლები) და საკვანძო სიტყვების ჩამონათვალი (key words).

5. ცხრილები საჭიროა წარმოადგინოთ ნაბეჭდი სახით. ყველა ციფრული, შემაჯამებელი და პროცენტული მონაცემები უნდა შეესაბამებოდეს ტექსტში მოყვანილს.

6. ფოტოსურათები უნდა იყოს კონტრასტული; სურათები, ნახაზები, დიაგრამები - დასათაურებული, დანომრილი და სათანადო ადგილას ჩასმული. რენტგენოგრამების ფოტოასლები წარმოადგინეთ პოზიტიური გამოსახულებით **tiff** ფორმატში. მიკროფოტოსურათების წარწერებში საჭიროა მიუთითოთ ოკულარის ან ობიექტივის საშუალებით გადიდების ხარისხი, ანათალების შედეგის ან იმპრეგნაციის მეთოდი და აღნიშნოთ სურათის ზედა და ქვედა ნაწილები.

7. სამამულო ავტორების გვარები სტატიაში აღინიშნება ინიციალების თანდართვით, უცხოურისა – უცხოური ტრანსკრიპციით.

8. სტატიას თან უნდა ახლდეს ავტორის მიერ გამოყენებული სამამულო და უცხოური შრომების ბიბლიოგრაფიული სია (ბოლო 5-8 წლის სიღრმით). ანბანური წყობით წარმოდგენილ ბიბლიოგრაფიულ სიაში მიუთითეთ ჯერ სამამულო, შემდეგ უცხოელი ავტორები (გვარი, ინიციალები, სტატიის სათაური, ჟურნალის დასახელება, გამოცემის ადგილი, წელი, ჟურნალის №, პირველი და ბოლო გვერდები). მონოგრაფიის შემთხვევაში მიუთითეთ გამოცემის წელი, ადგილი და გვერდების საერთო რაოდენობა. ტექსტში კვადრატულ ფხიხლებში უნდა მიუთითოთ ავტორის შესაბამისი N ლიტერატურის სიის მიხედვით. მიზანშეწონილია, რომ ციტირებული წყაროების უმეტესი ნაწილი იყოს 5-6 წლის სიღრმის.

9. სტატიას თან უნდა ახლდეს: ა) დაწესებულების ან სამეცნიერო ხელმძღვანელის წარდგინება, დამოწმებული ხელმოწერითა და ბეჭდით; ბ) დარგის სპეციალისტის დამოწმებული რეცენზია, რომელშიც მითითებული იქნება საკითხის აქტუალობა, მასალის საკმაობა, მეთოდის სანდოობა, შედეგების სამეცნიერო-პრაქტიკული მნიშვნელობა.

10. სტატიის ბოლოს საჭიროა ყველა ავტორის ხელმოწერა, რომელთა რაოდენობა არ უნდა აღემატებოდეს 5-ს.

11. რედაქცია იტოვებს უფლებას შეასწოროს სტატია. ტექსტზე მუშაობა და შეჯერება ხდება საავტორო ორიგინალის მიხედვით.

12. დაუშვებელია რედაქციაში ისეთი სტატიის წარდგენა, რომელიც დასაბეჭდად წარდგენილი იყო სხვა რედაქციაში ან გამოქვეყნებული იყო სხვა გამოცემებში.

აღნიშნული წესების დარღვევის შემთხვევაში სტატიები არ განიხილება.

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A STUDY OF SPATIAL ORIENTATION AND CONSTRUCTIVE PRAXIS DISORDERS IN NORMALLY DEVELOPING AND MENTALLY RETARDED CHILDREN AGED 8-11

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Abstract.

Aim: To study spatial orientation and constructive praxis disorders in normally developed and mentally retarded children aged 8-11.

Materials and methods: The research was performed in the research laboratory of the Faculty of Special and Inclusive Education at the Armenian State Pedagogical University after Kh. Abovyan and Armenian state institute of physical culture and sport. A total of 131 children aged between 8 and 11 years participated in the study, including 73 healthy schoolchildren and 58 children with mild mental retardation.

Results: The results of the experimental study of task performance show that interesting data have been obtained which will serve as a basis for the development of necessary means, methods, and conditions for the development of elementary practical orientation in mentally retarded elementary school children.

The analysis of the results of the study allows us to highlight the following important points:

- Mentally retarded younger pupils lag behind their healthy peers in all the studied indicators.
- 8-9-year-old have less developed practical spatial orientation skills than their older counterparts.

Conclusion: The results of the conducted experimental research testify to insufficient development of elementary practical orientation and understanding of spatial relations of objects in mentally retarded elementary school children.

Key words. Interhemispheric interaction, brain functions, spatial orientation disorders, intellectual disabilities.

Introduction.

The ability to orientate in space is one of the basic conditions for the harmonious development of a person [1].

The problem of human orientation in space is quite multifaceted. It includes both ideas about the size and shape of objects and the ability to distinguish the location of objects in space, understanding of different spatial relationships. The notion of spatial orientation includes the assessment of distances, sizes, shapes, mutual position of objects and their position relative to the orientator.

The simplest forms of spatial orientation, associated with the transition to the upright position and the development of object actions, are formed as early as infancy. By the age of three a child develops a systematic mechanism of spatial orientation in which vision, kinesthesia, and static-dynamic sensations are interconnected.

By entering all areas of a child's interaction with reality, spatial orientation influences the development of self-awareness and personality and is an integral part of the socialization process.

Spatial orientation refers to "a person's understanding and determination of his or her position in relation to some material

bodies that he or she has chosen", or, similarly, their position in relation to himself or herself.

For mentally retarded children, spatial orientation is significantly hampered because the impairment of mental development not only limits their motor activity, but also negatively affects the development of temporal representations, musculoskeletal function and leads to a decrease in compensatory processes.

The scientific and methodological literature indicates the importance of developing spatial representations and practical orientation of mentally retarded children but does not reveal the potential of their content. Therefore, the problem of correction of spatial representations and orientation disorders, as well as the development of orienting skills in the conditions of special school education are of extreme importance [2].

Thus, the purpose of our study of spatial orientation and constructive praxis in normally developing and mentally retarded children 8-11 years old [1-19].

Materials and methods.

The research was performed in the research laboratory of the Faculty of Special and Inclusive Education at the Armenian State Pedagogical University after Kh. Abovyan.

A total of 131 children aged between 8 and 11 years participated in the study, including 73 healthy schoolchildren and 58 children with mild mental retardation.

The degree of mental retardation was assessed on the basis of medical indications, degree of social adaptation, level of intellectual functioning and mastery of the school programme during training in a special educational institution.

Each category of examinees was divided into 2 age groups: 8-9 years old and 10-11 years old.

Control group of healthy schoolchildren:

- 8-9 years old 38 children, including 20 girls and 18 boys.
- 10-11 years old 35 children including 17 girls and 18 boys.

Experimental group of children with mental retardation:

- 8-9 years - 28 children, including 11 girls and 17 boys.
- 10-11 years old 25 children, including 12 girls and 13 boys.

Children in the experimental group were selected on the basis of supporting documents with an approved diagnosis of mild mental retardation. After reviewing the results of clinical, laboratory, pedagogical and psychological examinations, a voluntary agreement was signed with family members and care givers to allow the child to participate in the research.

In order to determine the level of development of elementary practical orientation: the subjects were offered the following tasks:

- show their right (left) hand.
- show the right (left) hand to the other person standing opposite.
- indicate what is on your right (left) side.

All studies were conducted separately for children with a leading right hand and a leading left hand, as it is reasonable to

assume that children will be more successful in tests aimed at their leading hand.

We first sought to find out whether children with intellectual disabilities can correctly identify their right and left hand and the person facing them, how well they can orient in space and determine what is on their right or left side, identify the right or left-hand drawer of a table, put objects into the right or left-hand pocket of a jacket, etc. Because such elementary practical orientation skills often determine a mentally retarded child's readiness to perform the more complex social, occupational, and other activities needed in everyday life.

In these experiments we widely used both the verbal designation of objects and actions, and drawings, pictures of the same objects and actions contained in the proposed task. These are first of all household items and their pictures, well-known to children: a key, a table, a glass, a pencil, etc. As pupils of special (auxiliary) school often deal not only with natural objects, but also with their images.

In addition, the graphic representation of objects and actions with them will help correctly and more quickly identify difficulties in completing the proposed tasks, as in the works of T.I. Golovina [3, 4] and others there is data indicating a lack of understanding by mentally retarded younger pupils of the spatial relationships of the depicted objects. Taking this into account, we tried to use certain groups of words and word combinations reflecting spatial relations of objects.

Before subjects started each subsequent task, we inquired whether they understood the meaning of the task, and until they had a clear idea of the meaning of the task and what was required of them, they did not proceed with it.

Results.

Experimental results for children with a leading right hand and a leading left hand:

The first task. ("Show your right (left) hand") was aimed at determining the subjects' right and left-hand orientation skills. Of the 29 normally developing right-handed children 8-9 years of age, 69% of the students correctly oriented themselves, while only 47.3% of the 19 mentally retarded right-handed children managed to do this task (Table 1).

In the group of 10-11-year-olds with no intellectual disability, there were 28 right-handed children, of whom 75% (21 children) showed correct orientation, (25%) 7 children made a consistent error.

The ambidextrous were counted in the right-handed groups because their sensory asymmetry of the praxis test revealed a right-handed preference.

Out of a total of 73 children with normal mental development, 13 left-handed children were identified, distributed roughly equally across age groups: 7 children aged 8-9 years and 6 children aged 10-11 years. The test showed that 57% of 8-9-year-old and 83.3% of 10-11-year-old performed correct side preference (see Table 2).

In the experimental group of children with mental retardation, there were seven left-handed children in each age group (14 in total). Among 8-9-year-old, 43% and among 10-11-year-old 57% correctly coped with the task, while orientation disorders

were found in 57% and 43%, respectively, by age group.

As seen from these results, children in the older age group (ages 10-11) did better than children in the younger age group (ages 8-9). This trend was also observed in the group of mentally retarded children, although it was not as pronounced as in the normal group.

So, we can state that mentally retarded "right-handed" and "left-handed" children are poorly oriented in identifying right and left-handedness and lag behind compared to normally developing peers in these measures.

The second, more difficult task "Show the right (left) hand to the other person standing in front of you" caused great difficulties for mentally retarded students. Only 31.0% of 8-11-year-old pupils in special (auxiliary) schools were able to cope with this task. Many normally developing children also had some difficulty with this activity, but to a much lesser extent.

The table shows that 8- and 9-year-old children were most likely to confuse the right and left hands of the person standing in front of them. Thus, about 81.3% of mentally retarded 8-year-old children could not cope with this task, 9-year-old 76.5%, and 10-11-year-old children, although they improved slightly, still remain at a low level. Compared to normally developing peers, the performance of mentally retarded children is significantly lower (Table 3). For example, while normally developing examinees correctly identified the right and left hand of the person standing in front of them by age 10-11, the mentally retarded peers improved in the performance of this task from 18.6% to 38.5%, respectively, by age 8-11.

Thus, the data presented indicate a significant difficulty for mentally retarded students to mentally turn 180 degrees. This confirms the evidence in the literature about the lack of maturation of the system of backward orienting actions in children of this age.

In the following task, when asked, "What is on your left (right) side?", retarded children mostly noted large objects, although not all of them. For example, they named a cupboard, a table, chairs, a window, but they did not notice small objects such as books, a pen, pencils, a vase, etc. (although they were nearby).

Among mentally retarded children of age 8, only two children (23.5%) handled this task satisfactorily, while among 9-year-olds only 4 (23.5%) out of 17 children handled the task. By the age of 10-11 these figures increased slightly, but still remained low (Table 4).

Thus, more than half of the 10-11-year-old children were able to list objects on their right (or left) side. These indicators are significantly lower as compared to normally developing examinees (Table 4). This lag is observed at all ages under study but is most pronounced at the age of 8-9.

So, the results of the research indicate that mentally retarded students at the age of 8-11 have poor right-hand and left-hand orientation, and even worse for the other person standing in front of them and have difficulty correctly and completely enumerating objects on their right or left-hand side. Although these indicators improve somewhat with age, they are still low by the fourth grade.

Mentally retarded children have been found to be significantly inferior to their normally developing peers. This generally

Table 1. Results of 'right-handed' test takers on the task to show right (left) hand.

Age	Test takers									
	Normally developing children					Mentally retarded children				
	Number Of test takers	Correct		Mistake		Number Of test takers	Correct		Mistake	
num		%	num	%	num		%	num	%	
8-9	29	20	69	9	41	19	9	47,3	10	52,7
10-11	28	21	75	7	25	18	10	55,5	8	44,5
Total	57	41	72	16	28	37	19	51,3	18	48,7

Table 2. Results of "left-handed" subjects in the task show the right (left) hand.

Age	Test takers									
	Normally developing children					Mentally retarded children				
	Number Of test takers	Correct		Mistake		Number Of test takers	Correct		Mistake	
num		%	num	%	num		%	num	%	
8-9	7	4	57	3	43	7	3	43	4	57
10-11	6	5	83,3	1	17,7	7	4	57	3	43
Total	13	9	68,5	4	31,5	14	26	44,8	34	58,6

Table 3. Results of the correct performance of the task "Show the right (left) hand of the other person standing in front of you (left) hand of the other person standing opposite".

Age	Trial subjects					
	Normally developing children			Mentally retarded children		
	Number of test takers	Correct answers	%	Number of test takers	Correct answers	%
8 years	19	13	68,4	16	3	18,6
9 years	21	15	71,4	17	4	23,6
10 years	16	11	68,8	12	6	30,0
11 years	17	14	82,3	13	5	38,5
Total	73	43	58,9	58	18	31,0

Table 4. Results of the correct performance of the task "Point out what is on your right (left) on your right (left) side".

Age	Trial subjects					
	Normally developing children			Mentally retarded children		
	Number of test takers	Correct answers	%	Number of test takers	Correct answers	%
8 years	19	15	78,9	16	2	12,5
9 years	21	18	85,7	17	4	23,5
10 years	16	12	75,0	12	5	41,7
11 years	17	13	76,5	13	5	38,5
Total	73	58	79,5	58	16	27,6

indicates that they have insufficient understanding of spatial relationships of objects and poor orientation.

In view of the above, it is most important to study the features of development of practical orientation of mentally retarded schoolchildren, connected, first of all, with domestic, educational, labor, and other types of activity. In this connection, the subjects were offered the following practical tasks:

- show the right and left drawers of the table.
- to put a key in the right (left) pocket of a jacket.
- to determine whether a pencil was on the right or left side of a notebook lying on the table.

These tasks, in comparison with those presented earlier, are of a more abstract nature, they are less equal in degree of habituality for children and are aimed at determining the abilities and skills of mentally retarded children to correctly orient to the sides of the study table, to the location of this or that object in relation to others, etc.

Conclusion.

The results of the experimental study of task performance show that interesting data have been obtained which will serve as a basis for the development of necessary means, methods, and conditions for the development of elementary practical orientation in mentally retarded elementary school children.

The analysis of the results of the study allows us to highlight the following important points:

- mentally retarded younger pupils lag behind their healthy peers in all the studied indicators.
- 8–9-year-old have less developed practical spatial orientation skills than their older counterparts.

The listed errors are generally reduced to the use by mentally retarded pupils of imprecise, vague spatial characteristics instead of more differentiated ones. This vividly illustrates the limited and incomplete verbalization of spatial relations of objects in mentally retarded children.

Thus, the results of the conducted experimental research testify to insufficient development of elementary practical orientation and understanding of spatial relations of objects in mentally retarded elementary school children.

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