

Hippotherapy for pain syndrome during next postoperative period after women's knee arthroplasty.



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Relevance of work

- Total arthroplasty is a highly efficient method of knee joint function restoration during the severe case of knee joint defeat.
- About 5000 operations in knee joint arthroplasty are held in Saint Petersburg during a year.
- Among the operated patients prevail women (eighty two point four percents).(82,4%)
- A big amount of patients complain about the pain of knee joint and shin at night and the painkillers are ineffective.
- At night the patients have to walk because of pain.
- Pain intensity decreases during the day time, but a patient is not able to do physical exercises.
- Rehabilitation potential decreases, the dates of rehabilitation increase and the result of the given treatment becomes worse.
- The reasons of the mentioned pain syndrome are not defined. Most often the patients don't get proper treatment, during the most difficult cases the pain becomes chronic.



Research issues

What are the results of the surgical treatment for today?

- ▶ Most of the patients after total arthroplasty of knee joint are still having functional violations for a long time:
 - the limit of range motion in knee joint;
 - the violation of gait.
- ▶ the knee joint pain can persist during six months after the operation.

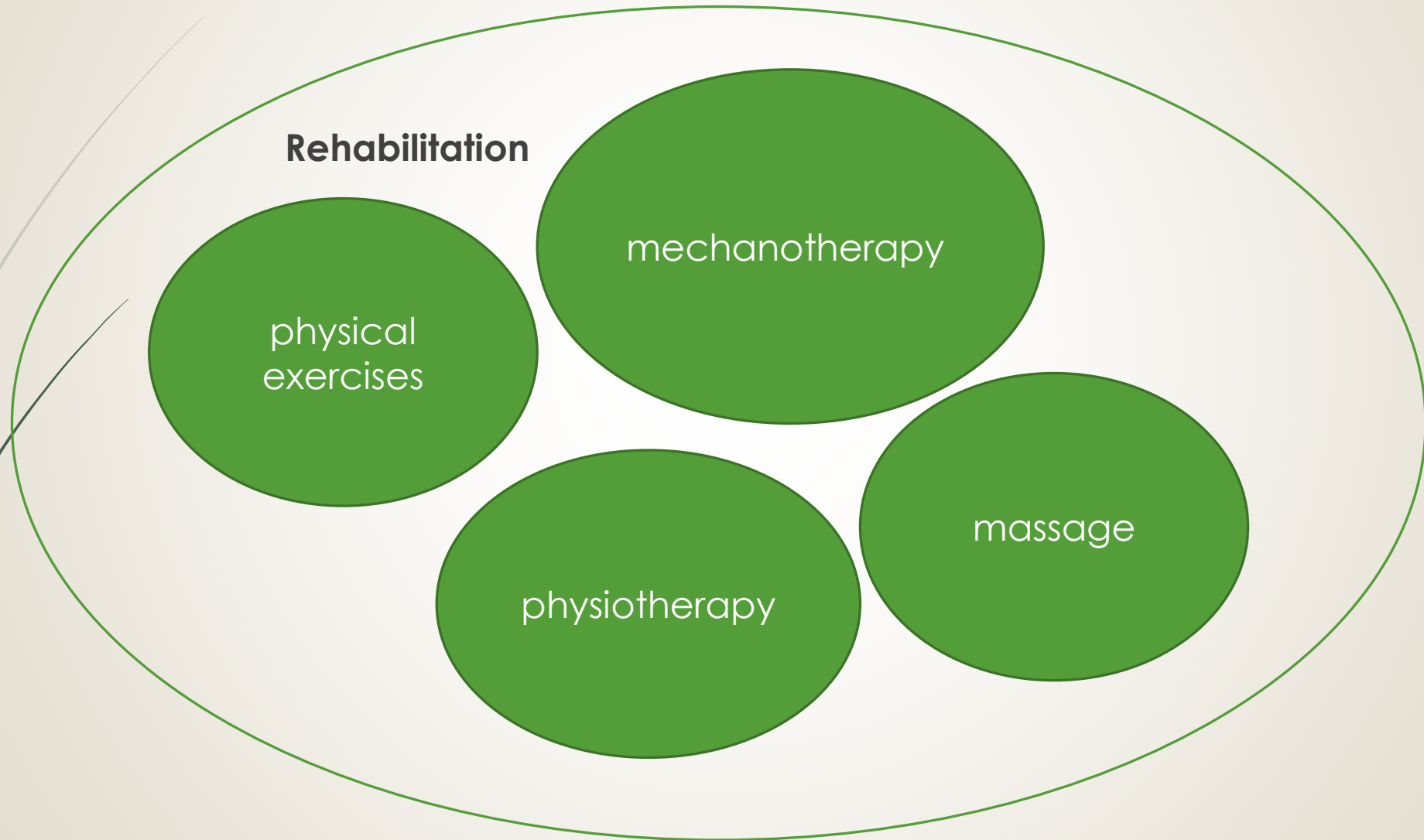


Characteristic of pain:

- strong night pain;
- decreases while walking;
- painkillers are ineffective.



What methods in rehabilitation are used today?



The important aspect of physical rehabilitation on this stage is the formation of the right walking stereotype. The patient cares about the operated limb, does not unbend leg in the knee joint while walking, makes a shorter step with operated leg. It can lead to formation or fixing of being flexion contracture of knee joint. A big amount of patients complain about the night pain in knee joint and shin after the knee joint arthroplasty, when the painkillers are ineffective, though the intensity of pain decreases at day time. Generally a series of pathological events happens. During the day time the pain syndrome limits the volume of movements in knee joint, but at night sleeping becomes worse (because of pain patients have to walk), the general well-being becomes worse, the patient is not able to do physical exercises, stagnations in the down limb are staying, pathological circle closes, and that is why the rehabilitation potential decreases, the dates of rehabilitation increase and the result of the given treatment becomes worse. Taking into consideration the frequency of appearing of pain syndrome in the knee joint and shin during the next postoperative period after women's knee arthroplasty it is possible to speak about the relevance of work on given topic and search of alternative ways of pain relief and new ways of rehabilitation.



Goals and objectives of the study

The aim of work is the rating of the results of rehabilitative treatment after the total women's knee joint arthroplasty by means of usage of hippotherapy for pain syndrome during the next postoperative period.

The problems of the research are:

- to find out the reasons of pain,
- to define the specific osteopathic disfunctions, which can cause patients' pain of the given group.
- to form the rehabilitation plan by means of a horse
- to make the efficiency rating of hippotherapy with the other methods of rehabilitation.

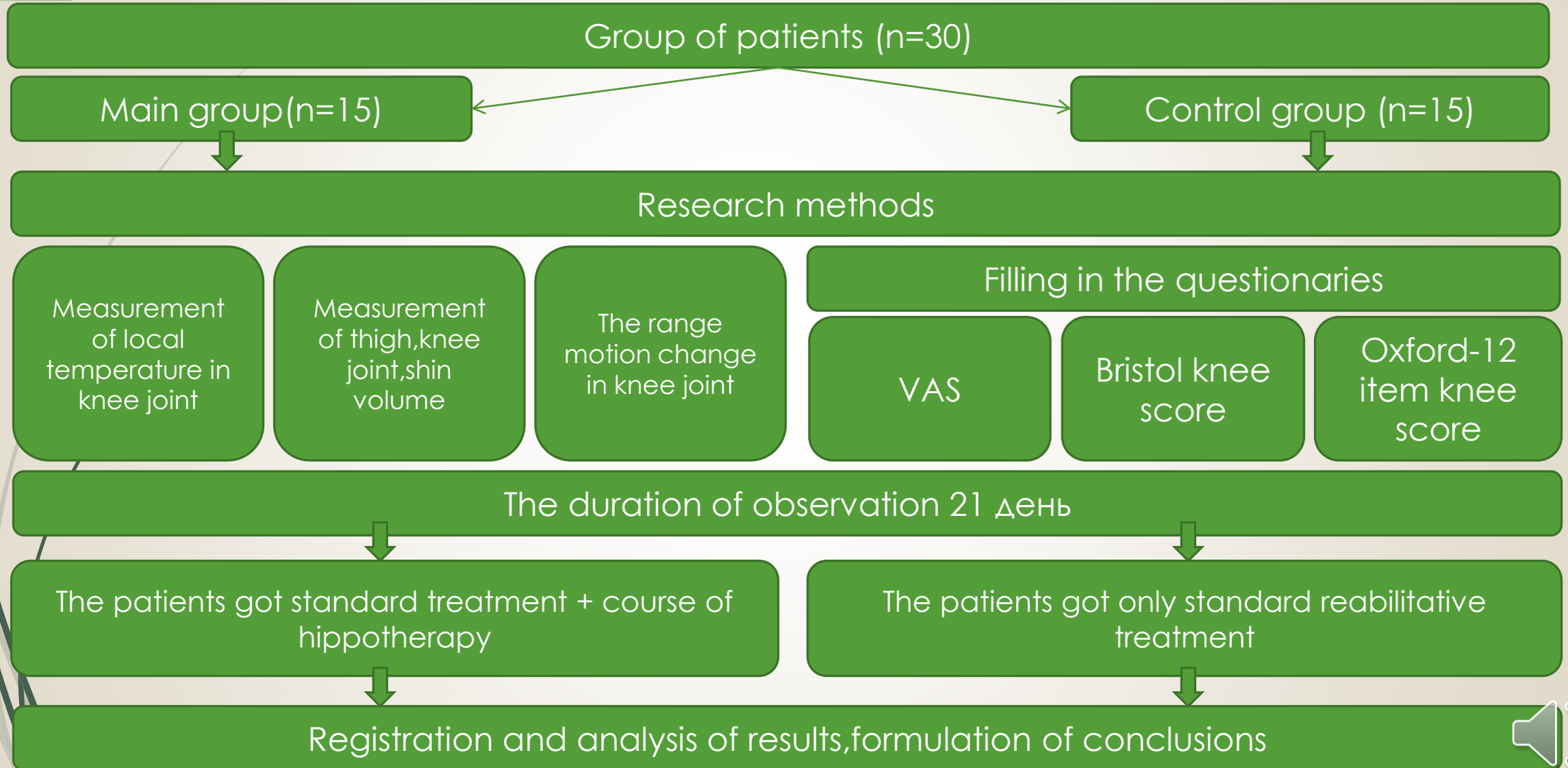


The object and the subject of the research are

- ▶ 30 women.
- ▶ at the age of 52 up to 78, the average age of the patients is 63,03
- ▶ all the patients were staying in rehabilitative centres during the next (from 2 weeks up to 3 months) postoperative period from September 2019 till December 2019.



Research hypothesis.



The standard course of rehabilitation included:

- ▶ a course of medical physical exercises in gym,



- ▶ mechanotherapy by means "Artomot- K-1";

- ▶ massage (ten-fifteen times);



- ▶ hardware physiotherapy according to medical indications.



The course of hippotherapy

The course of hippotherapy included 9 seances during 21 day (3 seances a week).

The course was devided into three stages:

- I the stage consisted of three seances during the first week, during these seances hippotherapy was held for 20-30 minutes. During this period the main attention was attracted the recovery of sacrouliac joints mobility, discomfort removalment in adductors of the thigh, posture and diaphragmal respiration.



- II the stage consisted of three seances during the second week, during these seances the exercises for relaxation of muscles of the high thigh group and of the high shin group, increased the range of motion were held.

- III the stage consisted of three seances during the third week, during these seances the exercises for relaxation of the thigh group and the high shin group, increased range of motion, exercise for strengthening muscles of anterior thigh group, exercises for balance were held.



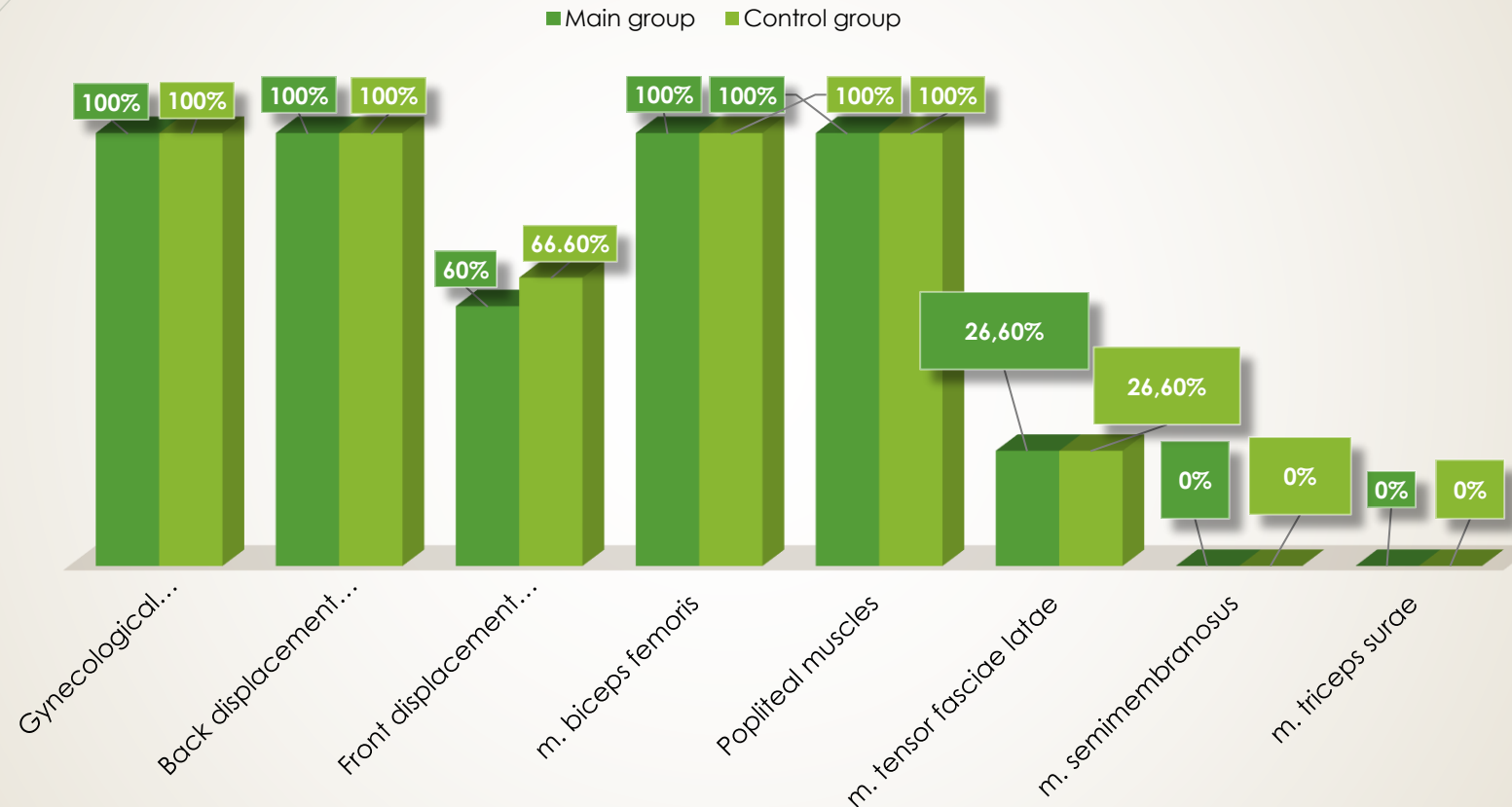
STATISTICAL DATA PROCESSING

- Statistical data processing was held by means of program «Statistics 10.0». After the first definition of feature description (Shapiro-Wilks test), it was determined that the sign differed from the normal one. That is why for comparison of unrelated aggregates the nonparametric test U Manna-Whitney was used. The data were introduced as Me (Q1;Q2), where Me - median (Q1;Q2) - interquartile range: the upper bound of the lower quartile (Q1) and the lower bound of the upper quartile (Q2). The critical level of significance was $p < 0,05$ (zero point zero five).



Results of research

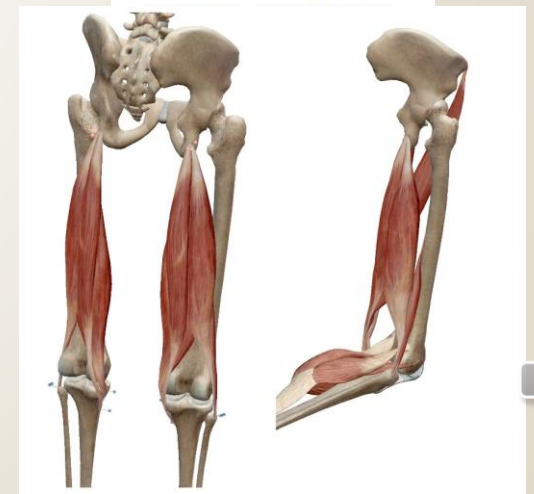
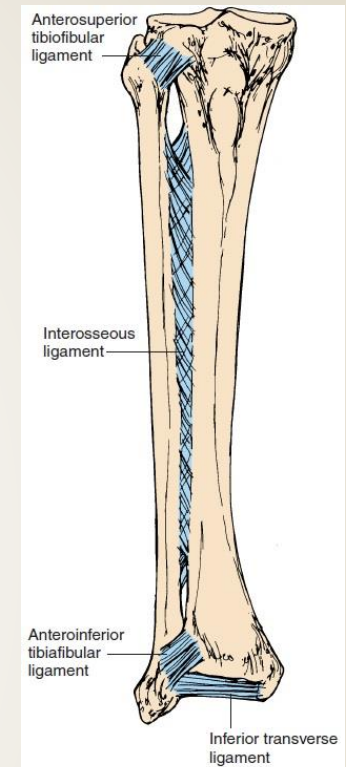
DISFUNCTIONS



all the women in both groups had a gynecological pathology in anamnesis. During the medical examination on the first day the osteopatic disfunctions and the tension of concrete group of muscles, shown in diagram, were revealed

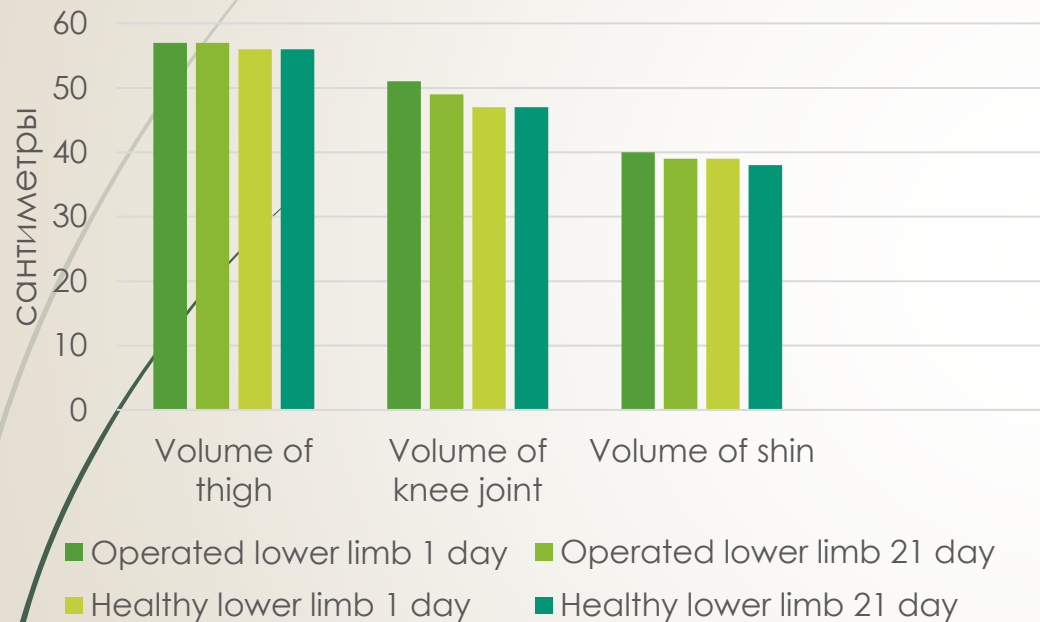


- Summing up what I have told you ,we can say that totally all the women in both groups had consominant gynecological pathology, rear offset of the peroneal bone head, tension in m. biceps femoris and popliteal muscles. The presence of osteopatic disfunctions may occur the disfunction of tibiofibular membrane movement, that disrupts venous outflow. The tension of popliteal muscles enhances venous congestion in the lower limb because of compression in neurovascular bundle in popliteal fossa. Probably, this group of osteopatic disfunctions appears as a reaction to structural changes in small pelvis, caused by gynecological pathology.
- After the rehabilitation treatment was held by means of a horse the tension in m. biceps femoris and popliteal muscles significantly decreased. Thirty per cents of the patients had total remove of peroneal bone disfunction.

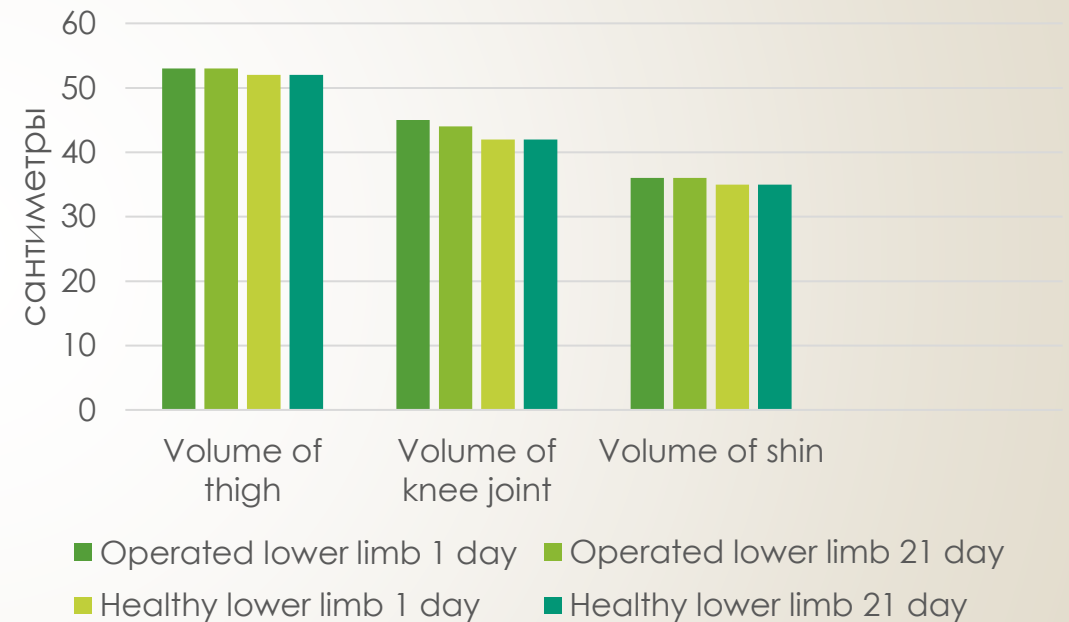


Results of research

Volume change of lower limb in the main group



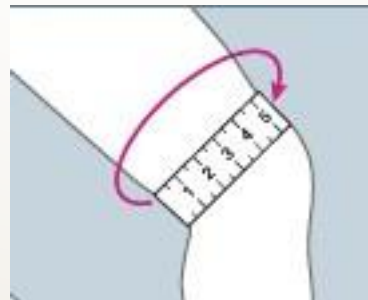
Volume change of lower limb in the control group



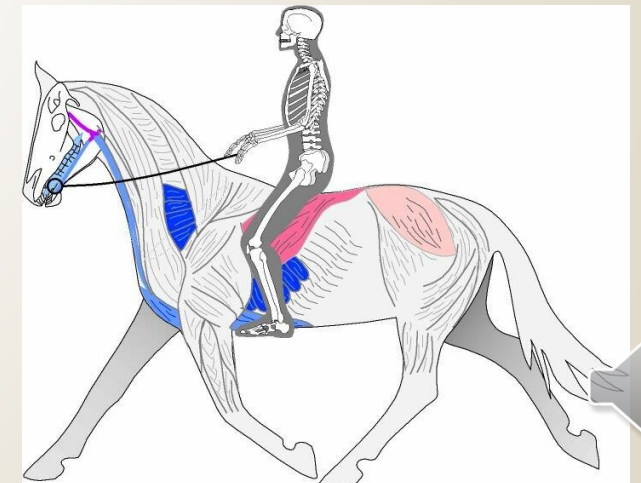
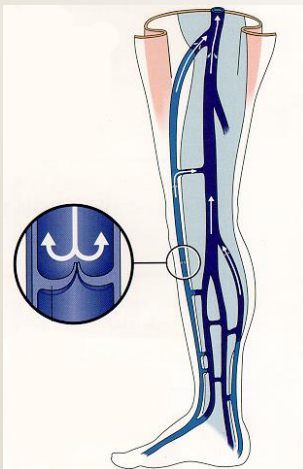
The swelling of tissues in the area of knee joint was defined by method of circumference measurement on the level of thigh, knee joint and shin on the first day of treatment and after the rehabilitation treatment. The degree of edema was estimated in comparison to unoperated limb.



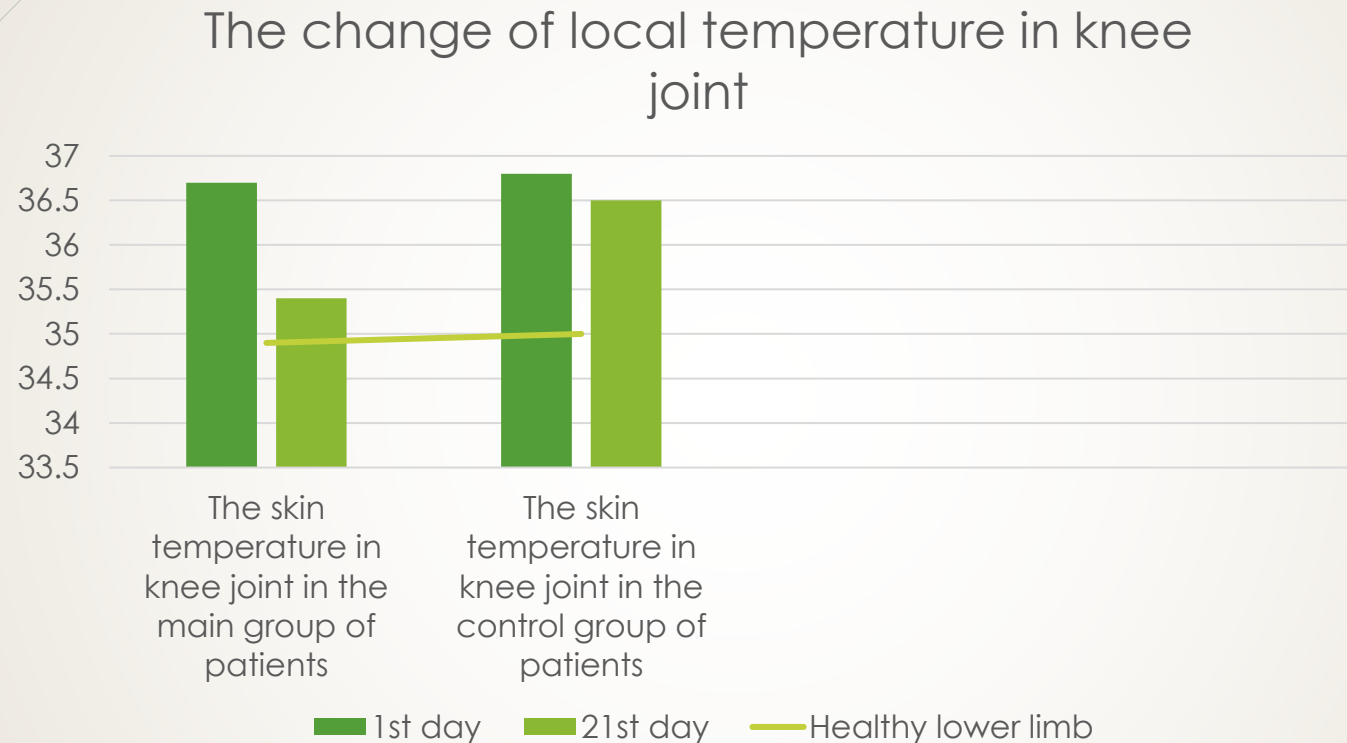
- It is shown in diagram that the largest edema was detected in the area of the knee joint and was approximately +4 centimeters more in the main group and +3 centimeters more in the control group. After the treatment held in the main group the patients had decreased edema on 2 centimetres, and in the control group the patients had decreased edema only on 1 centimeter. The volume difference between operated and unoperated knee joint was 2 centimetres.
- In both groups patients did not have any volume difference at the area of thigh. The volume difference of shin between operated and unoperated limbs in the main and in the control group was 1 centimeter on the first day of medical exam. After the treatment in the main group the volume of shins of lower limbs decreased on 1 centimeter. The difference in the control group was the same in 21 day.



So, we can claim that the usage of hippotherapy method brought not only significant decrease of edema of the operated lower limb, but also brought decrease of shin volume of the unoperated lower limb in the main group. It tells us about the presence of a small edema in both limbs which is connected with venous congestion in small pelvis before the operation. Such changes may occur because of movement disfunction in small pelvis, sacroiliac joints, the changes in elasticity of the musculoskeletal pelvis system, pelvis diaphragm. Heterolateral step of horse potentiates the proper movement in patient's sacroiliac joints, improves the elasticity of the musculoskeletal pelvis system because of the rhythm and amplitude. The work of horse's back muscles actively influences the pelvis diaphragm. All the facts, mentioned above, create preconditions for a proper functioning of small pelvis and recovery of venous outflow in lower limbs.



Results of research

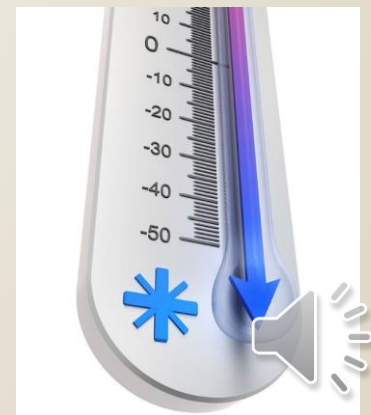
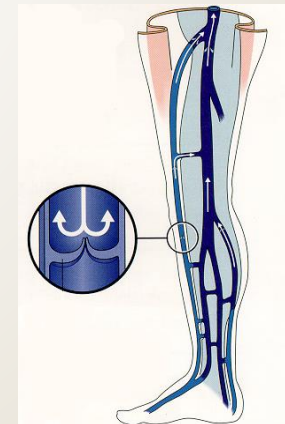
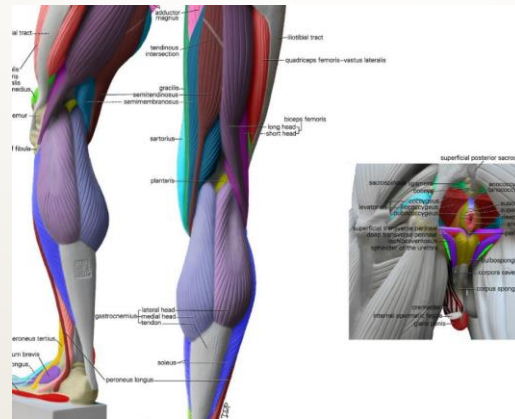
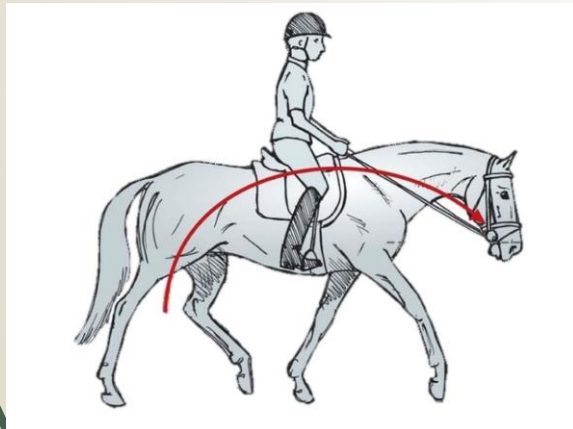


The increase of local temperature in the area of knee joint is mentioned during the measuring procedure that can be connected with local inflammatory reaction, appearing because of edema in lower limb, and is the sign of venous congestion.

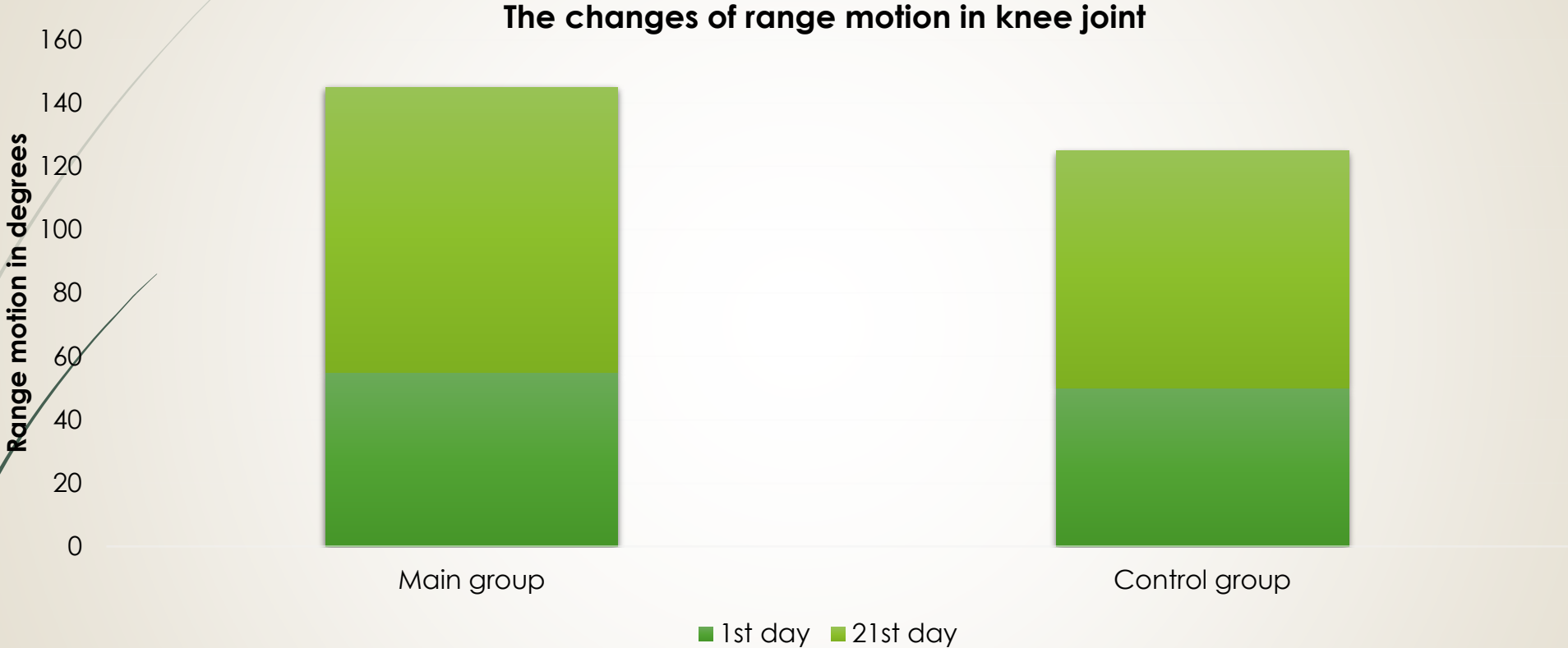


It can be seen in the diagram that in the main group the local temperature of the operated knee joint significantly decreased (on $1,3^{\circ}\text{C}$) after the treatment. In the control group the temperature decreased only on $0,3^{\circ}\text{C}$. We can say that the local inflammatory process decreases as a result of hippotherapy.

After the usage of hippotherapy, directed on recovery of muscles elasticity and ligamentous apparatus of pelvis, the decrease of tension in m. biceps femors and popliteal muscles, the function of pelvis diaphragm improved, the movement of peroneal bone and tibiofibular membrane recovered. The result was the significant decrease of local temperature in the knee joint, as the edema became smaller.



Results of research

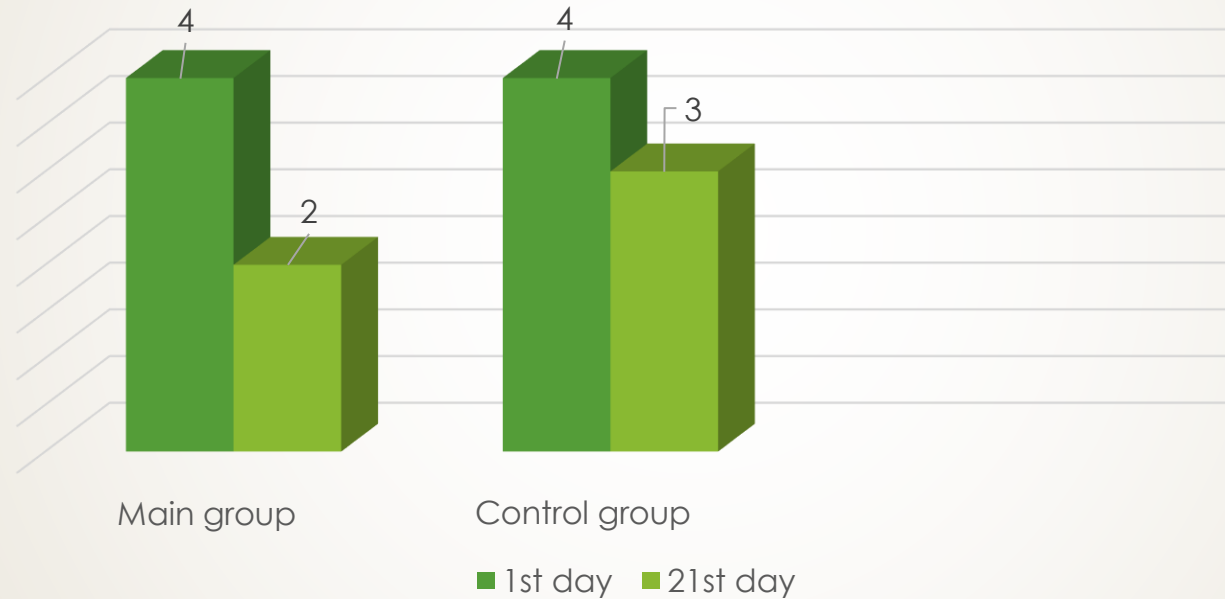


If we rate the volume of movements in knee joint, we will see in the diagram that the amplitude of movements in the main group increased 2, while in the control group the increase was only 1,5.



Results of research

The pain rating according to visual-analog scale

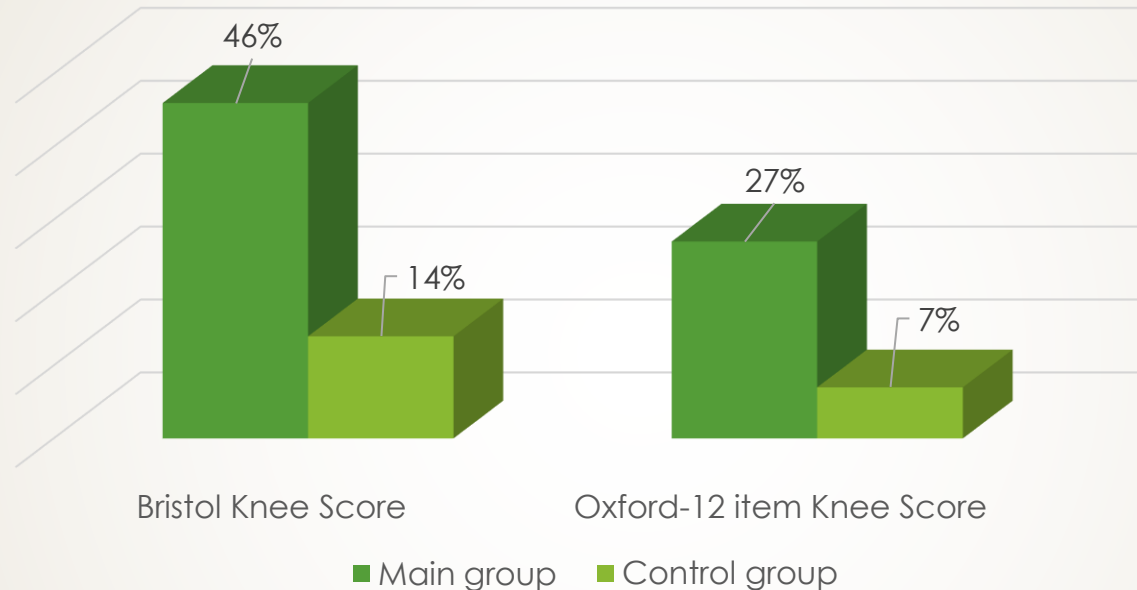


While rating the results got from the visual-analog scale, were made the conclusions that the night pain significantly decreased (2 scores lower) in the main group and not significantly in the control one (1 score lower).



Results of research

Изменения качества жизни



According to the results of the analysis Scale Bristol Knee Score the patient's life quality of the main group improved on 46%, while in the control group - only on 14%.

According to the results of the analysis Oxford-twelve item Knee score can be seen the fact that patient's life quality improved on 27% and on 7% in the main group and in the control group respectively.



CONCLUSIONS

- The main reason of the night pain is the edema of the shin and of the area around knee joint, connected with the dysfunction of tibiofibular membrane and hamstring tension.
- The main reason of edema is gonarthrosis m. biceps femoris, shortened during the progressive period, which after the treatment together with one moment unbending and axis alignment fixes the fibula head in back position. It blocks in its turn the movement of tibiofibular membrane that leads to destruction of venous outflow.
- As the result of research the regularity of growth of lower limbs edema, dysfunction of tibiofibular membrane, shortening of m. biceps femoris and gynecological pathology was found out. Taking into consideration the duration of this pathology growth, we can say that gynecological pathology is one of the reasons of gonarthrosis.
- The course of hippotherapy for this pathology is directed to recovery of elasticity of ligamentous apparatus of pelvis. The work of the horse's back muscles actively influences pelvis diaphragm. It gives the conditions for proper functioning of small pelvis and for recovery of venous outflow of lower limbs. The relaxation of m. biceps femoris and popliteal muscles leads to removal of dysfunction in peroneal bone and recovery of function of tibiofibular membrane.
- Hippotherapy in the next postoperative period promotes the decrease of postoperative edema, that significantly reduces the night pain, leads to early recovery of volume of movements in knee joint because of the immediate decision of several rehabilitation problems, accelerates patient's activity and improves the quality of life.





Thank you for attention

