The aim of the study was assessment of the early and long-term results following surgery for Dupuytren’s disease.

Material and methods. In this study the treatment results of 74 patients with Dupuytren’s disease were revealed. Patients were treated using fasciotomy, selective fasciectomy, subtotal fasciecotmy and dermofasciectomy. Patients were divided into two groups. Group I (n=35) was examined prospectively 3 times: prior to the surgery, 1 and 3 months after it. Group II (n=39) was examined retrospectively once between 3 to 7 years after the surgery. The examination took into account: occurrence of factors predisposing the disease to reappear (Dupuytren’s diathesis), hand’s function in patient’s subjective opinion evaluated with DASH questionnaire and goniometrical measurement of the contracture.

Results. Contracture reduction was observed in group I in 94% of patients. The average Total Loss of Extension before surgery was 123.85º, 3 months after operation – 54.51º. In group II the average Total Loss of Extension was 42.63º. Average DASH score in group 1 before surgery was 17.5. One month after the surgery a significant aggravation was observed (average score – 29.95). Three months after the surgery, there was an improvement and DASH score reduced to 15.02. The average DASH score in group II was 4.34. In both groups there was a correlation between patients’ age and hand’s function. Elder patients evaluated hand’s function as better after the surgery. Recurrence of the disease was observed in 17% of patients in group 1 and 33% of patients in group II. Occurrence of predisposing factors (diathesis) increased probability of recurrence in group II. Significant differences in treatment results were not notified because of the surgery technique.

Conclusions. This study reveals numerous problems with operative treatment of Dupuytren’s disease: faint improvement of hand’s function in primary months after surgery, large percentage of recurrences of the disease, a small number of patients with extension of fingers obtained as an outcome of the surgery.

Key words: Dupuytren’s disease, operative treatment, the function of the hand, DASH questionnaire

Dupuytren’s contracture is a progressive disease of undetermined etiology. It causes hand’s deformation which results in physical, as well as social consequences. Increasing fingers’ contracture without appropriate treatment unavoidably leads to physical disability which significantly decreases the quality of life.

The disease usually appears between the age range 49-54, 6 to 8 times more frequent men than women suffer from it (1).

The main symptom of the disease is a contracture of palmar aponeurosis with contracture of fingers in consequence (mainly the 4th and the 5th finger), spreading mostly over MCP and PIP joints (2).

Treatment of the disease comes down to an operative division (fasciotomy) or removal of fibrous Dupuytren’s cord (selective fasciectomy). When changes are more advanced, sometimes excision of contracted fascia and skin
above is necessary. In these cases skin loss is covered by skin graft (dermofasciectomy) or excision of almost whole fascia is performed (subtotal fasciectomy).

Surgical treatment is applied to suppress contracture and to improve the hand’s function. Unfortunately, treatment results are often unsatisfactory. In about 10% of patients, surgery does not cause contracture reduction (3). Worse effects are observed when the 5th finger is affected, where in 50% of patients any improvement is noticed. More than 17% patients show complications (nerve division, infections, hematoma, healing disorders, and also such ailments as: pain, stiffness or sympathetic dystrophy) (5).

Operative treatment does not guarantee suppressing the disease’s process. It is considered that in 41 to 54% of patients recurrence will appear during 5 years from surgery (5, 7). Recurrence means a reappearance of contracture in the area operated before. Other studies have shown that probability of recurrence depends on applied operative method. Lower probability of recurrence is observed in patients treated with more radical operative methods (8). It is connected with prolonged healing process, significant aggravation of hand’s function and necessity of longer rehabilitation (9).

Four factors affecting the severity of the disease and occurrence of the diathesis were described: early onset (people younger than 40), bilateral disease, ectopic lesions (Peyronie’s disease – growth of fibrous plaques in the penile corpora cavernosa, Ledderhose’s disease – plantar fascial fibromatosis) and positive family history (5, 10).

The aim of the study is assessment of the early and long-term results following surgery for Dupuytren’s disease.

MATERIAL AND METHODS

74 patients with Dupuytren’s disease treated in Hand Surgery Clinic (Medical University of Gdańsk) were enrolled into this study. Patients were divided into two groups. In group I (n=35) were patients operated in years 2007-2009 examined prospectively to assess early results of treatment. These patients were examined 3 times: prior to surgery, 1 and 3 months after it.

In group II (n=39) were patients operated in years 2002-2006 examined retrospectively once between 3 to 7 years after surgery to assess long-term results of treatment. In years 2002-2006 in the clinic 108 patients were treated for Dupuytren’s disease. 70 invitations were sent to patients living in the area of Tricity to increase probability of arrival to examination. Thirty nine patients attended the examination assessing long-term results of treatment. The average time which passed since the surgery had been performed was 5.41 years (±1.46).

The average age in group I was 63.8 years (±9.7), and in group II 67.15 years (±8.05). In group I there were 6 woman (17.14%), in group II – 10 (25.64%).

Examination of both groups consisted of an interview which was to establish: age, duration of the disease, occurrence of diathesis factors (early onset- younger than 40 years, bilateral disease, positive family history and ectopic lesions).

Analysis of data from examination showed in which patients’ diathesis factors occurred. The number of patients with diathesis factors is showed in tab. 1.

In group I twenty seven patients were treated with selective fasciectomy, 5 patients with fasciotomy, 2 with dermofasciectomy and 1 with subtotal fasciectomy. In group II twenty six patients underwent selective fasciectomy, 3 – fasciotomy, 10 patients subtotal fasciectomy. The number of patients operated with individual method is listed in tab. 2.

In both groups clinical examination was also carried out. It consisted of assessment of the contracture. The range of motion of affected

| Table 1. Occurrence of Dupuytren’s diathesis factors in patients from both groups |
|---------------------------------|-----------|-----------|
| Predisposing factors           | Group I   | Group II  |
| Early onset-younger than 40 yrs| 7         | 8         |
| Positive family history         | 8         | 10        |
| Bilateral disease               | 27        | 32        |
| Ectopic lesions                 | 0         | 2         |

| Table 2. Applied surgery methods in patients with Dupuytren’s disease in both groups |
|---------------------------------|-----------|-----------|
| Surgery method                  | Group I   | Group II  |
| Fasciectomy                     | 5         | 3         |
| Selective fasciectomy           | 27        | 26        |
| Subtotal fasciectomy            | 1         | 10        |
| Dermofasciectomy                | 2         | 0         |
Early and long-term results following surgery for Dupuytren's disease

Early and long-term results following surgery for Dupuytren’s disease

Early results

Contracture reduction, as a result of the surgery 3 months after it, was observed in 94% of patients in group I.

In group I analysis of Total Loss of Extension (TLE) before surgery showed 123.85º (±98.15), 1 month after surgery 53.23º (±68.45), 3 months after surgery 54.51 (±73.77). Improvement of range of motion in consequence of surgery was statistically significant. Changes in rate of contracture are presented in fig. 1. Full extension of operated fingers was observed in 9 patients from group I (25.7%).

Analysis of completed questionnaire of subjective outcome of hand’s function DASH showed that the average DASH score before surgery (DASH1) in group I was 17.5 (±14.88), 1 month after surgery DASH score (DASH2) increased to 29.95 (±18.20), 3 months after surgery (DASH3) decreased to 15.02 (±15.25). Differences between this scores were significant. A difference between outcome of hand’s function before surgery and 3 months after it, was not observed. Evaluation of hand’s function in three measurements are illustrated in fig. 2.

In group I, three months after the surgery recurrence was observed in operated area in 6 patients (17.14%). The correlation between occurrence of the diathesis factors and the recurrence was not observed (fig. 3).

Long-term results

In group II, Total Loss of Extension, after average time from operation 5.41 years, was 42.63º. Full extension of fingers in consequence of the operation was achieved in 14 patients (35.8%) in group II. This value was not a significant difference in comparison to results achieved in group I.

The results were statistically verified using Friedman ANOVA test in order to examine the changes in measurement in time. Moreover, U Mann-Whitney’s and Fisher’s tests, Spearman’s correlation and Kruskal-Wallis rank test were performed. A value of p<0.05 was considered statistically significant. In statistical analysis STATISTICA 7.0 Pl was used.

RESULTS

Early results

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The average DASH score in group II was 4.34 (±6.10). Significant difference between DASH score 3 months after surgery in group I and DASH score in group II was observed. There was a significant correlation observed between DASH scores and goniometric measurement (Spearman’s correlation 0.52; p=0.000003).

There was also a correlation between patients’ age and the outcome of hand’s function in group I and group II. In both groups older patients assessed their hand’s function after surgery better.

In group II thirteen patients (33.33%) experienced the recurrence in operated area. The average follow-up was 5.41 years, however it is not possible to determine when exactly the recurrence occurred. There was no significant correlation between diathesis factors and recurrence, however, a trend to this correlation is observed (fig. 4).

There was no significant differences between the amount of recurrences in group I and group II, whereas the general trend of greater amount of recurrences in group II is noticeable (p=0.09).

### Table 3. Recurrence appearance In patients treated with particular surgery methods in both group

<table>
<thead>
<tr>
<th>Surgery method</th>
<th>Operated patients from group I and group II</th>
<th>Recurrence In group I and group II</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fasciotomy</td>
<td>9</td>
<td>4 (44.4%)</td>
</tr>
<tr>
<td>Selective fasciectomy</td>
<td>47</td>
<td>8 (17%)</td>
</tr>
<tr>
<td>Subtotal fasciectomy, dermofasciectomy</td>
<td>16</td>
<td>6 (37.5%)</td>
</tr>
</tbody>
</table>

### Table 4. DASH evaluation and contracture value In both groups with regards to applied surgery method

<table>
<thead>
<tr>
<th>Surgery method</th>
<th>DASH</th>
<th>Total Loss of Extension (º)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fasciotomy</td>
<td>8,85</td>
<td>65</td>
</tr>
<tr>
<td>Selective fasciectomy</td>
<td>9,96</td>
<td>51.85</td>
</tr>
<tr>
<td>Subtotal fasciectomy, dermofasciectomy</td>
<td>9,67</td>
<td>31.88</td>
</tr>
</tbody>
</table>
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found. The average age of patients with recurrence was 65.17 (±9.03), and patients without recurrence 65.67 (±9.88).

**DISCUSSION**

Therapeutic management with Dupuytren’s disease is a very difficult issue. Results of treatment are still unsatisfactory. Surgery gives a chance of improvement as far as the range of motion is concerned. However, it is known that expanse of operative treatment affects the function of patient’s hand. Moreover, it is burdened with great risk of complications and frequently therapy ends with failure in relation to occurrence of recurrence.

Two groups were involved in the study. Group I was examined prospectively, Group II- retrospectively. The study was carried out in two groups to present early and long-term results after performing the surgery for Dupuytren’s disease. To fully illustrate continuum and dynamic of recovery/process of the disease the group I would have to be observed after the surgery (at least 5 years after).

To approximately determine, what kind of results can be expected after the several years’ observation of patients from group I, the prospective study was initiated. Results from group II illustrate a phenomenon that can appear few years after the surgery: an improvement of hand’s function, however with increasing recurrence rate.

In the study a fairly low attendance rate was observed. It can be assumed that it was caused by long distance from the place of residence (in the clinic patients from the whole province are treated), difficulties with attainment followed by declining age and diseases.

One month after the surgery a significant improvement of range of motion in group I was observed in 94% of patients. Similar findings were revealed by other scholars (1, 11). However, full fingers extension as a consequence of the surgery was reported only in 1/3 of patients. Other studies have shown that in 80% of patients almost a full extension can be expected (6). It can be assumed that better surgery results would be achieved in early undertaking the operative treatment (13). In Polish reality queuing time for surgery is sometimes longer than 2-3 years. It appears to be important to start a restraining treatment or decelerate the process of the disease while waiting for the surgery. Other studies in these situations suggest needle aponeurotomy which can be undertaken with a local anaesthesia in a treatment room (14). Needle aponeurotomy was first undertaken in the clinic in 2009 in an isolated incidents, thus, assessment of this method is not possible yet.

Increase of DASH score after surgery shows aggravation of hand’s function according to patients’ opinion. A significant aggravation of function in the first month after surgery reveals a dimension of the interference in elements of mobile apparatus of the limb. Puzzling is the absence of significant improvement of hands function in 3 months after surgery. To assess effectiveness of operative treatment 3 months’ observation is too short. However, such an early outcome of surgery results illustrates extensiveness of the procedure and its nuisance to the patient. Reasonable seem to be a necessity of forewarning patients about the loss of function, surprisingly long time of wound healing and other difficulties after surgery. Patients exhaustively informed about the possible complications, recurrence and prepared to discomfort after operation, better pass through recovery process and better assess treatment results. This is the way to avoid patients’ disappointment (15). It also enables organizing the patients life (sick leave, for singles – help with daily activities) after leaving hospital.

To verify this data, another examination should be done after full tissue repair, that is 6 months after surgery. Other studies reported significant improvement of hand’s function basing on DASH questionnaire in 12 months after surgery (16). This hypothesis seems to be relevant after analysis of DASH scores in group II where outcome of hand’s function is significantly better than in group I three months after surgery.

Statistic analysis showed that as the TLE increases – the worse is hand’s function in patient’s opinion. Such correlation shows that DASH test can be successively used as a sensitive tool to assess hand’s function in Dupuytren’s disease, because it correlates with the size of the contracture. A significant correlation between the size of contracture and hand’s function has also been shown in other studies (12, 16, 17).

Older patients better assessed hand’s function after operative treatment. It appears
relevant that this regularity comes out of less activity of these patients. Those patients frequently were retired for years, haven't been doing any complicated labors nor hard physical work. Puzzling is the fact that Żyluk and Jagielski in their study have observed aggravation of hand’s function in older patients after surgery. This result has been interpreted by them as a worse reaction of older hand on treatment caused by little possibility of correction, healing disorders and greater percentage of complications (16).

In the study a trend to greater number of recurrences in group II is observed. There is a suspicion that with passage of time the percentage of recurrences would increase. Other studies showed that during 5 years 41-54% of patients would have had a recurrence of the disease (4, 5).

The influence of diathesis on recurrence has also been shown previously. In this study the regularity was not found, however in group II (examined few years after surgery) this trend was observed.

There was no correlation between the patients’ age and recurrence. It may show that appearance of recurrence depends on other factors such as surgery method, diathesis or others.

Other studies are not unanimous if applied surgery method determines recurrence. It has been suggested previously that frequency of recurrences is rather determined by dynamics of disease process than by a technique of treatment. However, Houston reported that risk of recurrence might decrease after dermofasciectomy (9).

This study showed only a trend of lesser amount of recurrences in patients after partial fasciectomy in comparison to those operated with fasciotomy or dermofasciectomy. Increased amount of recurrences after fasciotomy probably is related to the fact that in this method affected aponeurosis is not removed. In patients after dermofasciectomy and subtotal fasciectomy percentage of recurrences might be higher because they are applied when disease process is more aggressive. Although in patients after the most radical methods, recurrence appeared more often, the average Total Loss of Extension after surgery was lesser. It might show that full correction of contracture is possible with almost total excision of the fascia. Other studies present three basic terms: recurrence, relapse and progress. Where recurrence means appearance of contracture in operated area and progress – beyond this area.

In evaluating of treatment results relapse or recurrence can be mentioned, however, due to other studies both phenomena are difficult to differentiate. Relapse can be divided into real or false. False relapse can be caused by contracting of a scar or joint elements. Real relapse is a formation of new fibrotic tissue in operated area. Progress is, however, a formation of contracture in the area other than operated. McGrouther reported that recurrence can be caused by renewed process or can be depended on changes in mechanical structure caused by surgery or contracted scars. Clinically and histologically it is often tough to distinguish recurrence from scar. It is not unequivocal if the lesion qualify as recurrence or as progress when it is observed on operated ray proximally or distally to the operated area (15). Authors of the study suggest similar point of view.

Examination enables only exclusion of joint contracture. Palpation examination of end-range resistance in the joint and assessment of its character (soft, hard, tough) enables to assess if limitation is from the joint structures (pressing cartilage on the bone, tension of articular capsule or ligaments) or if it is caused by contracting of soft tissues. However, it is impossible to determine if the contracture is caused by contracting process in fascia, infiltrating skin with the lesion or with scar contracting (19).

Because of the small number of patients operated with individual method, group I and group II were joined. In case of increasing the number of these groups more precise evaluation of the results might be possible, and results can differ from those presented in the study.

Other studies agree that early assessment of hand’s function depends on the method of the surgery. It has been emphasized previously that the more radical surgery method the worse hand’s function in first months after surgery (6, 14). In analysed data worse hand’s function presented patients after subtotal fasciectomy or dermofasciectomy, thus the difference was not significant. Results from the study indicate numerous problems related to operative treatment: faint improvement of
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hand’s function in first months after surgery, great percentage of recurrence, small number of patients with full extension achieved. To obtain more complete information concerning causes of these problems, to determine which operative method gives better results of treatment and to define probable causes of recurrence prolongation of observation time and extension of the number of patients is essential.

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