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Summary

Introduction: The aim of the present observational study was to evaluate the effects of the first lockdown 2020 on the patients of our Movement Disorders clinic.

Methods: We included 65 patients with Parkinson's disease and 40 patients with post stroke spasticity in our observational study. Medical examinations were performed prior to the lockdown, after the end of the first lockdown in June and at the end of October 2020. Participation in physiotherapy, occupational therapy, sports activities and general physical activity were recorded. In addition data regarding pain, falls, neurological functioning and access to medication were collected. Ambulatory patients performed a walking test.

Results: The discontinuation of physiotherapy and occupational therapy and the marked reduction of sports activities correlated with a decrease of general physical activities/week. We observed an increase of pain and spasticity. About 20% of patients with post stroke spasticity lost their independence in some aspects of self-care activities. Both groups of patients needed more time for the walking test after the lockdown. The effects of the lockdown continued until October 2020.

Conclusion: Discontinuation of physiotherapy, occupational therapy and reduction of sports activities had severe and long lasting consequences for the physical and mental condition of our patients.

Keywords

Lockdown – Movement disorders – Physiotherapy – Sports – Occupational therapy – (Neurological decline)

ORIGINAL PAPER / SPECIAL ISSUE

Effects of the first lockdown on patients with Movement disorders during the SARS-CoV-2 pandemic

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At the beginning of 2020 severe acute respiratory syndrome has spread worldwide. Due to the rapid viral transmission the German government took emergency containment measures. Hygiene rules and social restriction measures were introduced. The public life was shut down. Thus, the COVID-19 pandemic has a major impact on the life of the general population. It even may have more consequences to patients with chronic neurologic diseases such as movement disorders. People with chronic neurological conditions infected with SARS-19-CoV2 may experience a more severe course of disease or delayed recovery [1]. Therefore, many patients were concerned of contracting COVID-19 and followed strict social distancing measures. Some patients even delayed their appointments in the outpatient department. In the following we will report on the effects of the first lockdown due to the SARS-CoV-2 pandemic on patients of our Movement Disorders clinic. During the lockdown from March 2020 until May 2020 restaurants, hotels and shops were closed and people were asked to obey to the

hygiene rules and to prevent any unnecessary contact. Many patients avoided visits to physiotherapists or occupational therapists. In addition many physiotherapy and occupational therapy practices closed. Sports clubs were not allowed to conduct group training and sports therapy did not take place. Many hospitals stopped or reduced routine hospital activities during the lockdown. In our hospital we reduced the outpatient routine appointments for two weeks only and continued with the routine appointments afterwards. The aim of this observational study was to evaluate the effects of the discontinuation of regular physiotherapy, occupational therapy and sports classes on physical and mental condition of the patients.

Methods

We included 40 patients with post stroke spasticity and 65 patients with Parkinson's disease in our observational study. We usually perform a comprehensive medical examination twice a year. Therefore, we were able to use the results of the examinations we conducted prior to the

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Auswirkungen des ersten Lockdowns auf Patienten mit Bewegungsstörungen während der SARS-CoV-2-Pandemie

Zusammenfassung

Einleitung: Das Ziel der vorliegenden Untersuchung war, die Auswirkungen des ersten Lockdowns auf Patienten unserer Sprechstunde für Bewegungsstörungen zu untersuchen.

Methodik: Wir rekrutierten 65 Patienten mit Parkinsonerkrankung und 40 Patienten mit spastischer Hemiparese nach einem Schlaganfall für die Beobachtungsstudie. Alle Patienten waren vor dem Lockdown umfassend bezüglich ihres neurologischen Befundes und ihrer Fähigkeiten untersucht worden, die zweite Untersuchung erfolgte nach dem Ende des Lockdowns und die dritte Untersuchung Ende Oktober 2020. Die pro Woche erhaltene Physio- und Ergotherapie sowie die sportlichen Aktivitäten und die allgemeinen körperlichen Aktivitäten wurden erfasst. Zusätzlich wurden die Patienten bezüglich Schmerzen, Stürzen, körperlichen Fähigkeiten und Verfügbarkeit der Medikation befragt. Gehfähige Patienten absolvierten einen 12m-Gehtest ohne Drehung und einen 24m-Gehtest mit Drehung.

Ergebnisse: Die Unterbrechung der physio- und ergotherapeutischen Behandlung sowie die deutliche Verminderung der sportlichen Aktivitäten führten auch zu einer Reduktion der allgemeinen körperlichen Aktivitäten/Woche. Zusätzlich beobachteten wir eine Zunahme von Schmerzen und eine Verstärkung der Spastik bei unseren Patienten. Ca. 20% der Patienten mit halbseitiger Spastik nach Schlaganfall verloren ihre Selbständigkeit für Tätigkeiten im Bereich der Selbstversorgung. Beide Patientengruppen benötigten mehr Zeit zur Bewältigung der Gangtests. Die Auswirkungen des Lockdowns auf unsere Patienten waren auch im Oktober 2020 noch messbar.

lockdown as baseline examinations and conducted the second and third medical examination accordingly. The second assessment took place in June, the third in the middle of October. At the beginning of each visit to the outpatient clinic patients were asked for symptoms of SARS-19-CoV2 infection. Participation in sports activities, physiotherapy, occupational therapy, physical activity/week apart from sports activities, pain [2,3], falls and access to medication were recorded in both groups of patients. The stage of Parkinson's disease was rated according to the Hoehn & Yahr scale (H&Y) [4]. The modified Ashworth scale [5,6] was used for rating of spasticity in patients with post stroke spasticity. The ability to grip and hold a cup, to use a spoon and to dress was assessed in patients with post stroke spasticity. Patients who were able to walk performed a 12m walking-test without turn and 24m walking test with turn halfway [7]. Time for the walking tests was recorded. Patients were asked regarding their subjective perception of deterioration of motor function and mood. Mood was assessed by using the Geriatric depression scale [8,9]. All patients were asked about the use of online sports programmes. We used descriptive statistics due to the small groups. Basic assessments were conducted between the 20th. of January 2020 and the 10th. of March 2020, the second assessment after the first lockdown in June 2020 and the third assessment at the end of October 2020. We obtained ethical approval for the study from our local ethical committee.

Results

We conducted baseline examinations in 67 Parkinson's disease patients (PD patients) and 43

patients with post stroke spasticity but only 65 PD-patients and 40 patients with post stroke spasticity returned to the outpatient clinic. Three patients got COVID-19 infection, two died and 1 suffers from post covid syndrome. Two patients were too anxious to attend the outpatient clinic. Therefore, we included 65 patients with PD and 40 patients with post stroke spasticity in the observational study. None of these patients dropped out from the study. Table 1a and 1b show the demographic data of the patients. The results are shown for the Hoehn & Yahr stages 2-4 separately. Patients with post stroke spasticity were divided in three groups: patients who walked and did not use a wheelchair (w), patients who were able to walk but used the wheelchair for longer distances (w&w) and patients who depended on the wheelchair but were able to manage the transfer from bed to the wheelchair.

Only 4 of the 65 PD patients had physiotherapy and 3 of the 40 patients with post stroke spasticity during the first lockdown. Two PD patients and one patient with post stroke spasticity attended occupational therapy sessions between March 2020 and June 2020. Neither sports therapy nor training organized by sports clubs took place. Patients with Parkinson's disease had on average 100,5 + 33.8 min physiotherapy/week and 76.2 ± 25.9 min/week occupational therapy prior to the first lockdown. Patients with post stroke spasticity received on average 106.5 ± 23.4 min/week physiotherapy and 96.4 ± 27.4 min /week occupational therapy at the first assessment. Physiotherapy and occupational therapy were reintroduced in June and July 2020 but the scope of physio- and occupational therapy remained reduced. In

Schlussfolgerung: Die Unterbrechung der physio- und ergotherapeutischen Behandlungen und die Reduktion der sportlichen Aktivitäten hatten schwerwiegende und lang anhaltende Auswirkungen auf die körperliche und psychische Verfassung unserer Patienten.

Schlüsselwörter

Lockdown– Bewegungsstörungen– Physiotherapie– Sport– Ergotherapie– (Verschlechterung neurologischer Funktionen)

Table 1a. Demographic data of PD patients.

	H&Y stage 2 N = 10	H&Y stage 3 N = 50	H&Y stage 4 N = 5
Age	54.5 ± 5.8	57.6 ± 8.2	60.7 ± 9.4
Gender	6m, 4f	28m, 22f	4m, 1f
Work	N = 8	N = 10	N = 0
Duration of PD (months)	29.5 ± 8.6	92.5 ± 25.4	110.5 ± 28.3
Cognitive impairment	no impairment: n = 10	Mild: n = 3	Mild: n = 2

Table 1b. Demographic data of Patients with post stroke spasticity.

	Walking N = 18	Walking & wheelchair N = 15	Wheelchair N = 7
Age	52.5 ± 6.2	54.8 ± 5.9	58.9 ± 8.1
Gender	10m; 8f	6m; 9f	3m; 4f
Work	Y = 13; n = 5	Y = 5, n = 10	Y = 1, n = 6
Cognitive impairment	0	2	4
Aphasia	Mild: n = 2	Mild: n = 3, moderate: n = 2	Mild: n = 2, moderate: N = 2

October 2020 PD-patients received 62.7 ± 24.1 min /week physiotherapy and 56.9 ± 19.5 min /week occupational therapy, patients with post stroke spasticity had on average 68.7 ± 31.8 min/week physiotherapy and 62.3 ± 29.5 min/week occupational therapy/week.

Sports activities were reduced during the lockdown and remained at a lower level after the lockdown. Sports clubs did not resume their training schedules, people attending a gym had to follow strict hygiene rules and fewer people were allowed to do their work outs at the same time. Group training did not take place.

Online sports coaching and sports video sessions were used by 20 of 65 PD- patients and 10 of 40 patients with post stroke spasticity. Mainly patients with a partner used the digital training programmes.

Table 2a and b show the sports performed by the patients at the three assessments. Since public swimming

pools and gyms were closed patients could not continue to swim or to go to the gym. Some patients who were used to attend a group for Nordic walking, gymnastics or biking reduced these sports as well. Patients with post stroke spasticity depended more on the gym. Consequently, the time/week spent on exercises decreased and did not reach the level prior to the lockdown again. Fig. 1a and 1b show the time spent / week on exercise. As observed in previous studies a decrease of sports activities has an impact on general daily activity. Fig. 2 shows the decline of strenuous work conducted/week by PD patients. The effect was less pronounced on the scope of light and moderate work in PD-patients (Table 3a). PD patients acquired a more sedentary life style and spent more time sitting (Fig. 3) during the day.

Patients with post stroke spasticity showed a decrease in strenuous work/week and patients who needed

Table 2a. Patients with Parkinson's disease: Sports activity.

Sports activity	PD Stage 2 H&Y N = 10			PD stage 3H&Y N = 48			PD stage 4 H&Y N = 5		
	1	2	3	1	2	3	1	2	3
Assessments	1	2	3	1	2	3	1	2	3
Gymnastics	7	4	4	39	20	28	3	1	1
Gym	5	0	2	25	0	2	0	0	0
NW	6	4	5	34	22	24	1	0	0
Jogging	5	5	4	12	12	12	0	0	0
Biking/exercise bike	6	4	4	21	15	14	0	0	0
Swimming	4	0	0	18	0	2	0	0	0

Table 2b. Patients with post stroke spasticity: sports activity.

Sports activity	Walking N = 18			Walking & Wheelchair N = 15			Wheelchair N = 7		
	1	2	3	1	2	3	1	2	3
Assessments	1	2	3	1	2	3	1	2	3
Gymnastics	10	8	8	8	6	7	4	3	3
Gym	14	0	2	10	0	3	2	0	0
Jogging	2	2	2	0	0	0	0	0	0
Biking/exercise bike	10	7	7	7	5	4	3	1	1
Swimming	10	0	2	7	0	1	1	0	0

It was allowed to indicate different sports.

a wheelchair at times or were dependent on a wheelchair showed as well a marked decrease of moderate work/week (Table 3b). The lack of physiotherapy and occupational therapy had a major negative effect on the spasticity especially of the hand and the fingers (Table 4). The score on the Ashworth scale ranges from 0 (no spasticity) to 5 (high

spasticity, contractures). With increase of spasticity of the hand and the fingers we observed a decline of hand and finger function (Tables 5 and 6). The functional decline of the hand and fingers led to more dependence on the help of carers. Eight patients lost the ability to grip a cup or to use a spoon. Seven patients didn't manage to wash the

lower body without support, six patients couldn't dress the upper body and eight patients the lower body without help. PD patients needed more time for the walking test with a turn after 12m at the second and third assessment (Fig. 4a). The walking test was performed by 30 patients with post stroke spasticity. Patients were

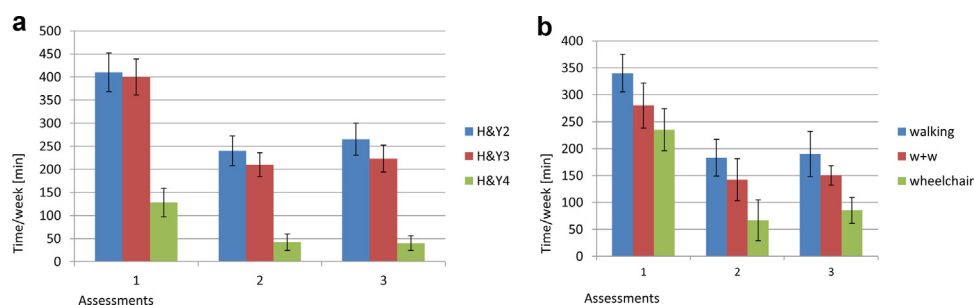


Figure 1

a shows the sports activity of patients with Parkinson's disease. PD patients spent less time with sports activities at the second and third assessment. Y-axis indicates the time patients exercised.

b shows the sports activity of patients with post stroke spasticity. Patients with post stroke spasticity spent less time with sports activities at the second and third assessment. Y-axis indicates the time patients exercised.

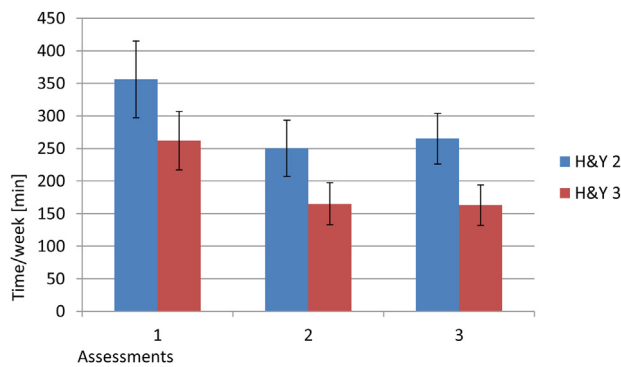


Figure 2 Shows the time/week (y-axis) PD patients spent with strenuous work. They spent less time/week with strenuous work at the second and third assessment.

slower in both walking tests (with-out and with turn) at the second and third assessment (Fig. 4b). Falls were more often recorded in both groups and increased by 25%. Apart from some skin cuts no severe injuries were observed.

More patients reported that they increasingly suffered from pain after the lockdown. While prior to the lockdown 24 of the PD patients reported on having pain, 43 confirmed to have pain after the

lockdown. PD patients reported on back pain, pain of the iliosacral joint and pain in the legs. At baseline assessment 10 PD patients described their pain as permanent and 7 as unbearable. After the lockdown 25 patients stated to have permanent pain in the back, iliosacral joint and the legs. 14 PD patients claimed that the pain was unbearable at times. Prior to the lockdown 16 PD-patients took painkillers on a regular

basis and 10 PD patients benzodiazepines, after the lockdown 29 PD patients took painkillers daily and 23 PD patients benzodiazepines. Benzodiazepines were often prescribed by the GPs because of muscle spasms and dystonia of the legs.

Patients with post stroke spasticity also reported a worsening of the pain. The pain was mainly located in the back muscles, thighs, feet and fingers. At the first assessment 10 patients with post stroke spasticity reported on having permanent pain, at the second assessment 18 patients suffered from permanent pain. While at baseline 8 patients described the pain as unbearable at times, at the second assessment 15 patients with post stroke spasticity described the pain as unbearable. Even at the third assessment 25 patients with post stroke spasticity suffered from pain more frequently than at the baseline assessment. At the baseline assessment 15 patients with post stroke spasticity took painkillers. After the lockdown the number of patients

Table 3a. PD patients: Light and moderate physical activity /week.

Physical activity/ week [h]	PD Stage 2 H&Y N = 10			PD stage 3 H&Y N = 50			PD stage 4 H&Y N = 5		
	1	2	3	1	2	3	1	2	3
light	21.7 ± 3.7	20.7 ± 4.2	19.8 ± 3.8	18.6 ± 3.6	16.7 ± 3.1	16.3 ± 3.3	15.2 ± 2.8	14.9 ± 2.6	14.5 ± 2.3
moderate	18.5 ± 2.9	16.2 ± 3.2	16.8 ± 2.9	12.4 ± 2.9	8.2 ± 2.5	9.1 ± 2.3	5.2 ± 2.1	3.1 ± 1.2	3.5 ± 1.3

Table 3b. Patients with post stroke activity: Physical activity/week.

Physical activity/ week [h]	Walking N = 18			Walking & Wheelchair N = 15			Wheelchair N = 7		
	1	2	3	1	2	3	1	2	3
light	15.6 ± 2.9	13.2 ± 2.2	13.5 ± 1.9	10.5 ± 2.1	9.4 ± 2.3	9.2 ± 1.9	8.7 ± 2.1	7.5 ± 1.9	7.3 ± 2.1
moderate	11.4 ± 2.3	8.5 ± 2.1	8.7 ± 2.1	7.2 ± 1.9	4.2 ± 1.8	3.9 ± 1.4	4.7 ± 1.5	2.1 ± 1.1	2.2 ± 1.1
strenuous	4.5 ± 1.8	2.1 ± 1.2	1.8 ± 1	2.3 ± 1.1	1.1 ± 0.6	1.3 ± 0.8	1.8 ± 0.7	1 ± 0.7	1.1 ± 0.5

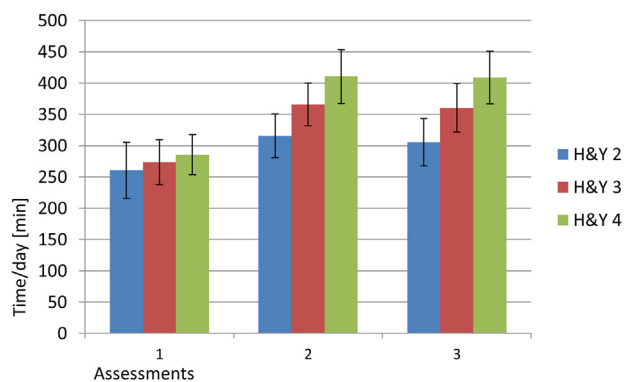


Figure 3

Shows the time/day patients with Parkinson's disease spent sitting. The time PD patients sat during the day had increased at the second assessment and did not decrease until the third assessment.

taking pain killers increased, 30 patients took painkillers and reported back pain, neck pain, pain in fingers and feet. Benzodiazepines were less often prescribed to patients with post stroke spasticity compared to PD patients but the dosage of spasmolytic drugs was increased (Fig. 4). Patients with post stroke spasticity suffered from pain more frequently at the follow

up assessments than at the baseline assessment.

Twenty-three PD patients complained of deterioration of motor symptoms and eighteen PD patients complained of recent sleep-disorders. 25 PD patients felt depressed, which was confirmed by the results of the Global Geriatric depression scale (GDS). Patients attained between 10 and 13 points on the GDS. The results suggested

that a depression was most likely. 15 patients suffered from panic attacks. 18 patients with post stroke spasticity reported of a subjective feeling of motor deterioration, 15 patients felt depressed, and 10 patients experienced panic attacks. Patients faced one more challenge. 20 PD patients had to change the company of at least one PD-drug and 5 PD-patients had no access to at least one substance. Patients with post stroke spasticity faced problems with the availability of certain strength of anti-spasticity tablets and of some drugs against hypertension.

Patient with PD put on weight about 4.3 ± 1.4 kg, patients with post stroke spasticity c. 3.8 ± 1.9 kg between March 2020 and October 2020.

Discussion

The discontinuation of physiotherapy, occupational therapy, sports therapy and training sessions in gyms and sports clubs had a major

Table 4. Assessment of spasticity using the modified Ashworth scale.

Assessments	1	2	3
Modified Ashworth Scale arm	2.2 ± 0.3	3.2 ± 0.2	2.5 ± 0.2
Modified Ashworth Scale hand	2.1 ± 0.2	4.2 ± 0.2	3.1 ± 0.2
Modified Ashworth Scale finger	2.0 ± 0.2	4.1 ± 0.2	3.2 ± 0.2
Modified Ashworth Scale leg	2.1 ± 0.3	3.3 ± 0.3	2.2 ± 0.3
Modified Ashworth Scale foot	2.1 ± 0.3	3.3 ± 0.2	3.1 ± 0.2

Table 5. Function of upper limb in patients with post stroke spasticity (N = 40).

Function	Assessments		
	1	2	3
Grip a cup	N = 26	N = 18	N = 20
Hold a cup	N = 18	N = 13	N = 16
Hold a spoon	N = 20	N = 12	N = 15

Table 6. Self-care activities in patients with post stroke spasticity (N = 40).

Assessments	1	2	3
Washing face and upper body without support	N = 35	N = 32	N = 32
Washing face and upper body with support	N = 3	N = 5	N = 5
Washing face and upper body taken over by carer	N = 2	N = 3	N = 3
Washing lower body without support	N = 32	N = 25	N = 28
Washing lower body with support	N = 3	N = 7	N = 6
Washing lower body taken over by the carer	N = 5	N = 8	N = 6
Dressing upper body without support	N = 27	N = 21	N = 23
Dressing upper body with support	N = 8	N = 11	N = 11
Dressing upper body taken over by carer	N = 5	N = 8	N = 6
Dressing lower body without support	N = 23	N = 15	N = 17
Dressing lower body with support	N = 11	N = 15	N = 14
Dressing lower body taken over by carer	N = 6	N = 10	N = 9

impact on the lives of PD patients and patients with post stroke spasticity. Patients decreased not only their sports activities but also their weekly physical activity, especially the more challenging activities. In accordance PD patients spent more time sitting, thus their life style became more sedentary. We had shown in a previous study [10] that there was a close correlation between sports activity and general physical activity. Probably sports

helps to increase muscle strength, endurance and balance. Thus, patients were better prepared to manage the challenges of daily life and don't get exhausted quickly. The more sedentary life style led also to an increase of body weight, which might be a risk factor for hypertension and diabetes. However, even after the lockdown patients did not return to their sports schedules and weekly physical activities. They remained

on a reduced level of physical activity until the third assessment in October 2020. All patients reported on deterioration of pain. PD patients located the pain to muscles and the iliosacral joint, patients with post stroke spasticity to areas of increased spasticity such as the hands and fingers. Both led again to a further decrease of physical activity and an increase of painkiller intake.

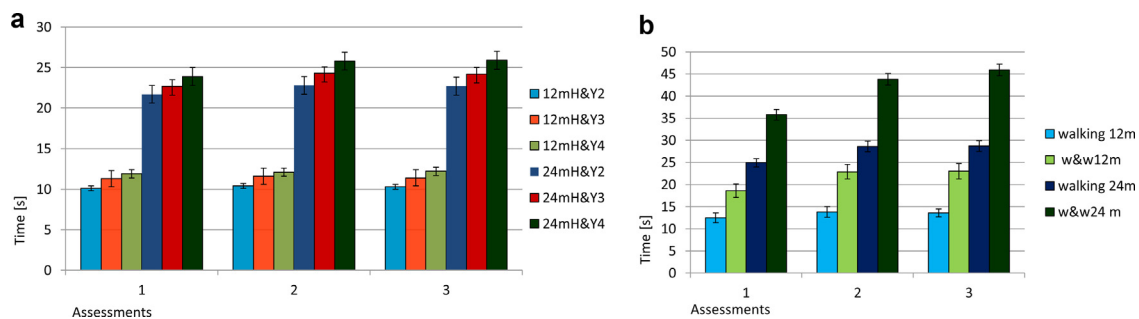


Figure 4

a. Webster Walking Test: Time PD patients needed for the 12m and 24 m walking test. PD patients needed more time for the 24 m walking test with a turn halfway at the second and third assessment.
 b. Webster Walking Test: Time ambulatory patients with post stroke spasticity needed for the 12m and 24 m walking test. Patients with post stroke spasticity needed more time for both walking tests at the second and third assessment. (w&w = walking & wheelchair)

Pain is the main reason for patients to refrain from physical activities. Vice versa inactivity enhances muscular and joint pain. Exercise is also recommended to patients with osteoarthritis. The increase of benzodiazepines intake due to muscle spasms and the increase of spasmolytic drugs in patients with post stroke spasticity rather worsen motor function and especially balance. Some patients felt sedated and slept during the day. Piano et al. [11] found in patients with deep brain stimulation (DBS) an increase of benzodiazepine intake during the COVID pandemic. The patients with DBS reported a feeling of insecurity as reason for the increased benzodiazepine intake.

Patients and their partners were not able to compensate for the lack of supervised training by increasing the individual training sessions. Patients, whose partners joined them for the training, completed more training sessions than patients who exercised on their own. The digital training sessions were used from a third of PD patients and 25% of patients with post stroke spasticity. Patients reported that it was difficult for them to follow. The introduction to the exercises was too fast and the patients had difficulties to carry out the exercises correctly. In addition they didn't get any feedback. PD patients have difficulties to realise how they perform the exercises and they rarely notice incorrect movements. Patients with post stroke spasticity have often sensory deficits and a disturbed position sense, therefore they need an external monitoring of the execution of the exercises. Accordingly, the implementation of telemedicine, a remote rehabilitation programme or sports therapy is important. The strict lockdown lasted 2 months but neither the swimming pools nor the gyms got

the permission to open immediately after the end of the lockdown. After re-opening of the gym the access to the gym was more difficult since fewer people were allowed to exercise at the same time and sessions had to be pre-booked. In addition patients were asked for a negative Corona antigen test. These factors seemed to be obstacles for the patients preventing them from returning to their exercise routine. Furthermore, the Corona rules still require social restriction, thus group training doesn't take place. Garg et al. reported [12] as well that due to social distancing, immobilization and lockdowns rehabilitative services might be interrupted for PD patients and pose hurdles on the provision of optimum medical therapy.

Patients with post stroke spasticity showed a decrease of neurological functioning. They had more pronounced spasticity and pain in hands and fingers and 20% of the patients lost the ability to grip and hold a cup and to use a spoon. They also needed more help with washing and dressing. Neurological deficits related to the lack of training were not so obvious in PD-patients but could also be observed. The walking test with turn halfway revealed coordination deficits not seen previously. Patients needed more time to turn than at baseline. The posture of PD patients got worse, patients were bent over indicating the lack of stretching exercises. Falls occurred more often in both groups implicating a potential risk of severe injuries. Due to the lack of physical activity combined with the social distancing measures patients presented a worsening of mood and quality of sleep and reported a subjective perception of neurological deterioration, especially an increase of muscle stiffness. The more patients felt isolated the more they complained of

physical symptoms. Some patients experienced panic attacks.

None of our patients participating in the study got a Corona virus infection. One might speculate that in contrast to some hypotheses [13] PD patients are not at a higher risk to get Corona.

Concluding the lockdown in March 2020 had a major and long lasting impact on the lives of the patients of our movement disorders clinic. The return to a more active lifestyle did not occur and might not happen in future either. The lockdown during the Corona showed the beneficial effects of regular physiotherapy, occupational therapy and sports and the severe consequences by withdrawal of these treatments.

Limitations: Our study is an observational study and we used descriptive statistics due to the small subgroups of patients. Despite this fact we think that the results are worth to report because we could show the beneficial effects of physiotherapy, occupational therapy and sports.

Conflict of Interest

The authors declare to have no conflicts of interest. They did not receive any grants or sponsorship related to the present study.

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