

*for LUCIA*

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# Preface

Concerning the choice of the topic for my master thesis it was very important to me that some people should profit from my work.

Thus the idea of dealing with addiction, withdrawal and their physical effects in terms of a holistic treatment for opioid addicted people by means of osteopathy, naturally under the consideration of all other current treatment methods, became ever more concrete.

It was fascinating for me to work with people who are often estimated negatively and looked at as inferior by society, because addiction is often regarded as self-inflicted. Addicts are often classified as outsiders. To treat them as absolutely normal fellow human beings – and I am convinced it was that for which I got so many positive reactions – made my work at “Walkabout” very useful.

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# 1 Introduction

The study at hand was conducted in Graz, Austria. Comparative studies and comments that were used, mainly come from the German-speaking world, as the options for drug withdrawal offered and the medication used vary significantly from country to country. Drug addiction is a disease whose progress, prognosis and therapeutic possibilities highly depend on political-ideological influences as well (Barazon, 2006 (a)).

To mention only one example: Substitol (Mundipharma) is prescribed as drug substitute in Austria and Slovenia only. In Austria substitution treatment is determined by the drugs act, the drugs decree and the substitution edict of the health ministry and in force in Austria only. The ambulatory care system becomes more and more important – in Austria as well as in its neighboring countries (Fischer, 2002).

Drawing comparisons to other European cities such as London or Liverpool or to some American cities would not be admissible, since the range of drugs accessible on the market is very different from that on the Austrian market and as a consequence the drug problem is also a different one. Thus the range of therapies offered to drug addicts has to be a different one, too.

Currently there are too few therapy offerings for opiate addicted people in Austria (Zeder, 2006; Zäuner, 2006; Uchtenhagen, 2006). Osteopathy seems to be a suitable complementary medical treatment method in order to extend these offerings. Dr. Ulf Zeder, addiction coordinator in Graz, stated in a panel discussion in Graz in November 2006 that each and every patient is an individual and thus has to be treated individually. Together the experts call for an extension of therapy offerings in the field of drug therapy in order to meet the manifold needs of the individual patients (Barazon, 2006 (b)).

In his book “Drogenreport Österreich“ [Drug Report Austria] the journalist and crime writer Günther Zäuner thematizes certain problems in the Austrian drug policy. The author, too, criticizes that there are too few therapy offerings for addicts (Zäuner, 2006).

The importance of osteopathy as complementary treatment method in withdrawal treatment consists in the fact that normally substance addiction (in this case opiates) is again treated exclusively with the aid of other substances (medicine and/or substitutes) as it is the case in the drug substitution program.

Especially drug addicts should sooner or later break with this addiction pattern, in order to find a way out of addiction. Applied besides “classical“ methods osteopathy should increase the well-being and health of patients during withdrawal and thus should contribute to a faster reduction of the substance and, in the long run, to abstinence.

Basically the point of this study is that people learn to feel themselves again, that they regain body consciousness during and after acute withdrawal, which can be alleviated by the administering of substitutes, which is methadone in the case of the rehab ward “Walkabout”. Amongst other things osteopathic treatment can lead to a feeling of improved physical and mental well-being and health.

Apart from acupuncture there is currently no further field-tested and widely accepted complementary medical measure in order to support the withdrawal and detoxication, as well as, regeneration phase.

In 1972 bilateral ear acupuncture was applied for the first time in the withdrawal therapy of cocaine and heroin addicts at Lincoln Hospital in New York.

A study of Markus Backmund et al. (2002) about acupuncture in drug withdrawal treatment tests the effectiveness of ear acupuncture in the framework of qualified drug withdrawal treatment. In a pilot study in 1999 69 of 132 patients volunteered for an ear acupuncture in addition to medication-supported qualified withdrawal treatment. Strikingly these patients more frequently ended treatment regularly than those who did not choose to take this voluntary offer (Backmund et al. 1999). It can be assumed that in this case especially the motivation of those patients who took part in the study played an important role. To sum it up one could conclude from the results that it seems very likely that acupuncture mainly modifies the affective-emotional components of pain processing (Reichenbach-Klinke, 2007).

The results of many scientific studies (partly randomized, single-blinded, partly including a big number of patients) concerning the effectiveness of acupuncture in addiction treatment are inconsistent until today (Backmund et al. 1999, 2002; Raben, 1999; Janssen, 2005; Thiele, 2007).

There are many studies and analyses that reveal a notable effect of the “NADA (National Acupuncture Detoxification Association)-Protocol“ concerning the clinical recovery of addicted patients. The treatment technique “NADA-Protocol“ combines ear acupuncture with a structured, non-frightening way of treatment. It is particularly responsive to the specific problems of addicted or mentally ill, very often truly ambivalent patients with alternating compliance (Raben, 1999).

From 2000 to 2003 two prisoners in a jail in Hamburg volunteered for and were treated with ear acupuncture treatment according to the NADA protocol. An evaluation of changes in the emotional state recorded in written reports of the prisoners showed a positive effect of ear acupuncture concerning relaxation, stress reduction, withdrawal alleviation (89%) and a minimized lust for drugs (86%). As Michael Smith, the founder of ear acupuncture according to the NADA protocol, originally thought, especially cocaine and heroin addicted prisoners benefited from this therapy offer (Thiele, 2007).

Because osteopathy, too, is a treatment method that works without medication or substitutes and is, like acupuncture, a complementary medical method, it seems useful to try and offer osteopathic treatment as a further method of treatment. Above all, because opiate addicts have similar, but nevertheless individually strong symptoms and pains during withdrawal, there should be offered a wide range of supply consisting of many different forms of treatment for the individual patients. The more options there are during withdrawal the bigger is the chance that patients bear up the process and overcome the lust for drugs and thus for later abstinence (b.a.s., 2007; Barazon, 2006(a); Zäuner, 2006).

If one takes a closer look at drug related research in Austria, one would find out that this is a hardly consistent area, which is dominated by the initiative of several single institutions or researchers only.

The mutual relationship of politics, practice and research has no established structure in Austria, but especially in the field of contract research results affect political decisions. Generally speaking it has to be said that in Austria neither a common research strategy nor any coordination centers in the area of drug addiction exist; neither on a national level nor on the level of federal states (Öbig, 2007).

This paper deals with the osteopathic treatment of opiate addicted patients during withdrawal. As mentioned above several Austrian experts call for a wider range of treatment offers for opiate addicts in drug therapy (Barazon, 2006 (b)).

This work is narrowed down to dealing with patients suffering from an addiction to opioids/opiates because the rehab ward “Walkabout“ has access to this particular clientele. This provides the opportunity to offer osteopathic treatment to people during withdrawal for the first time. From experience we know that due to low compliance it makes no sense to offer ambulatory treatments in the osteopathic office, as keeping appointments is very hard for people with addictions (b.a.s., 2007). This problem does not occur with in-patients.

In order to present the relevance of this thesis for society and for osteopathy, at the beginning some dates and facts concerning drug consumption in Austria shall be listed. Furthermore opiates and opioids as well as their effects and side effects are described. Besides mental and physical phenomena another explanatory model concerning addiction and effects of opiates/opioids shall be outlined with the aid of neurobiology. The subsequent chapter deals with the classification and definition of addiction.

As this paper deals with the treatment of addicts during withdrawal the different methods of withdrawal are presented and discussed. Subsequently different treatment concepts for osteopathic withdrawal treatment as well as thought models from osteopathy are depicted. Chapter 9 and 10 deal with the methodology of the study and the results of the statistic evaluation.



## **2 Drug monitoring**

Drug monitoring consists of prevalence estimation and data from the field of treatment in drug therapy. As the consequences of opiate consumption are physical and mental addiction as well as health related, social and legal problems in the following chapter some dates and facts concerning drug consumption in Austria and Europe shall be listed. Therefore mainly data from current annual reports of the Austrian Confederative Institute for Health Care [Österreichischen Bundesinstitutes für Gesundheitswesen (ÖBIG)] about the drug problem in Austria were used.

These reports are published on behalf of the European Monitoring Centre for Drugs and Drug Addiction in Lisbon and of the federal ministry. In 1995 therefore the REITOX Focal Point, which is part of the European Monitoring Center for Drugs and Drug Addiction, was established in the ÖBIG and since then has been the Austrian interface of a European network for the exchange of drug relevant data and information. In close connection therewith certain activities for the extension of a national monitoring system as well as quality protection are conducted. Besides Austria's collaboration in the REITOX- network there are also co-operations with other European projects, among others in the framework of the PHARE and CARDS program with middle, eastern and southern European countries.

### **2.1 Prevalence rate Austria**

Opioid addiction is a disease with a huge, highly avoidable mortality rate and somatic morbidity (BAG, Expertenkommission 1996).

What becomes clear from most representative studies concerning the population's drug consumption is that around one, maximum two, per cent have experience with opiates.

In connection with the consequences of drug consumption the Austrian Health Resort has collected data concerning drug related fatalities since 1989. Although death toll decreased from the mid 90s onwards, in the last years an increase could be observed again (Öbig, 2007).

According to the current "Bericht zur Drogensituation 2006" [report about drug situation 2006] of the Austrian Federal Institute for Health Care, a prevalence rate of up to 32.000 people with problematic opiate consumption – in most cases presumably in connection with polytoxicomane consumption – is plausible in 2004. Compared to the year 2001 this would mean an increase of 10.000 people at least. However, prevalence estimations concerning problematic drug consumption are, due to their complexity, associated with certain

methodological problems, which challenge their validity. Results should therefore be regarded more like an approximation (Öbig 2006).

In case of drug related deaths one has to distinguish between directly and indirectly drug related deaths. The number of deaths caused by intoxication has risen to 197 in the year 2006 (2005: 191 deaths). In 23% of cases toxicology detected exclusively illegal drugs (one or more toxic substances).

Like in precedent years mixed intoxication involving opiates prevails (81% of intoxication with known substances). The amount of mere opiate intoxications (16%), however, has decreased compared to precedent years (2003: 25 %, 2004: 22 %, 2005: 18 %).

Polytoxicomane consumption patterns, where the partly increasing effects of the different substances is hard to control, are still widely prevalent and pose an extreme health risk (Öbig, 2007).

Recently Termorshuizen et al. (2005) presented results from a long-term study according to which a minimum of 27%, presumably even 38%, of all drug consumers die within 20 years after they had started consumption (Soyka, 2006).

Opiates dominate the field of therapy and treatment as the most problematic drug. Thus it becomes evident that in Austria opiates clearly prevail concerning treatment relevant drug consumption (Öbig 2007).

## **2.2 Age**

The initiation age of problematic drug consumers, who are young people that suffer from an addiction syndrome, is between 12 and 30, around two-thirds are male and one-third is female (b.a.s., 2007).

The average age of persons who died directly from the consequences of drug consumption constantly rose until 2002. Since 2003 a steady decrease has been observed. In 2006 it was 24,6 years (2003: 28,4, 2004: 26,1, 2005: 25,9). The number of people in this group under the age of 20 lies in the fluctuation range of the last years (2003: 12 %, 2004: 22 %, 2005: 15 %). The number of 20 to 24 year olds is, with 25 % , in the average of the last years (2003: 23 %, 2004: 22 %, 2005: 25 %).

Fluctuations concerning the number of directly drug related deaths have to be interpreted carefully because of their low number in terms of statistics and may not be equaled with the development of the overall drug situation.

As by 2006 the number of directly drug-related deaths has risen for the fourth year, one has to proceed from a deterioration of the situation concerning drug-related deaths. This should trigger off a change of thinking concerning risk reduction in this area (Öbig, 2007).

The study of X-SAMPLE about the drug situation among young people in Graz conducted in 2002, dealt with inquiring valid data about young people's knowledge about and attitude towards drugs as well as about individual drug consumption of young people in Graz.

Concerning prevalence rate it revealed partly higher values in comparison with other studies; these are however, according to the experts' estimation, probably nearer to the number of unreported cases (X-SAMPLE, 2002).

In connection with other findings from drug monitoring the increase of drug-related deaths (also under consideration of the decrease of the average age to an all-time low) may be interpreted as a hint for an increase of problematic opiate consumption in Austria (Öbig, 2007).

And this is why it is so important for general public that each opiate consumer should have the opportunity to choose from a wide range of therapeutic solutions including additional treatment measures such as, for example, osteopathy. Osteopathic treatment could mean easy access to pleasant treatment. And thus the number of drug deaths could be reduced in the long run.

### **2.3 Costs**

Nowadays addiction is one of the biggest problems concerning society and health. On the one hand because it causes high direct and indirect costs because of reduced work efficiency, accidents etc. and on the other hand because addiction has also severe consequences on the social environment (Öbig, 2007).

Studies about public drug-related costs are hardly ever conducted in Austria, as hardly any data is at hand. It is interesting that of the total costs that incurred because of "addiction" (1.444 million Euros) the majority (1.043 million Euro) are indirect costs because of sick leaves, premature pension etc. (Öbig, 2007).

## **3 Opiates and Opioids**

As this study deals in particular with patients who are addicted to opiates/opioids, in the following chapters these terms shall be described. Furthermore their effects and side effects on the human body shall be explained.

### **3.1 Opiates**

The term opiate describes natural agents that can be processed from the opium poppy. The best known and firstly described (1806) opiate is morphine whose name is derived from Morpheus, the Greek God of dreams (Fischer, 2002).

The chemical structures of natural opiates can be altered in the lab to the effect that they result in half-synthetic derivatives. Besides, there are fully synthetic substances, as, for example methadone, which trigger effects that are similar to those of the opiates (Fischer, 2002).

### **3.2 Opioids**

Opioid (lat. "opium-like") is the umbrella term for substances that have a morphine-analogue effects. The name for this group of substances is derived from the natural mixture of substances, called opium, whose constituents are called opiates. Opioids are a chemically heterogeneous subgroup of the analgetics, but are also an important drug. Its use is subject to the Austrian drug's act.

#### **3.2.1 Opioid receptors**

Opioids are substances that develop their effects by interaction with special receptors (molecular binding places) on the surface of nerve cells and other kinds of cells in the whole body, the so-called opioid receptors. These include also substances that are not part of natural opiates, such as endogenous opioids. Not all opiates bind to opioid receptors and thus not all opiates are opioids. Not all opioids are opiates and belong to totally different classes of substances than the opiates (Fischer, 2002). Pert & Snyder were the first researchers who could localize opiate receptors in the brain of mammals in 1973 (Stoll, 1997).

The endogenous ligands of the opioid receptors are endogenous peptides (enkephalins and endorphins) that play an important role concerning stress reaction. Opioid receptors occur most frequently in the brain at the bottom of the 4<sup>th</sup> ventricle, in other areas of the brain and in the spinal medulla. Furthermore they can be found in periphery, e.g. in the bowel and cause

a deceleration of the bowel motor function and are thus used against diarrhea. Contrary to non-opioid analgetics, opioids mainly develop their analgetic effect in the central nervous system (CNS) (Seidenberg, 1998).

Receptors for endorphin and opiates can be found in the grey substance of the spinal medulla. These zones are localized at ventricle walls and in the aquaeductus mesencephali. A high density of opioid receptors can be found above all in the anatomic substrates of the rewarding system of the brain, in the pain conducting system, the spinal medulla and the dorsal nerve root ganglia, in the nigrostriatal pathway (extrapyramidal motor function, fine-tuning of movements), in the hippocampus (memory) in the amygdala (sexuality and aggression) as well as in the hypothalamus (eating, fighting, avoidance reaction) (Liem, 1998; Seidenberg, 1998).

A stimulation of these zones leads to an increase of the endorphin concentration in the liquor cerebrospinalis (LCS) and to analgesia, as in case of stimulation of the endorphin receptors pain stimulus is suppressed. This is also verified by the results of a study about cerebral pain processing by Reichenbach-Klinke (2007).

There are agonists and antagonists on the opioid receptors. Agonists cause an effect on the receptor; antagonists are ineffective (Hinghofer-S, 1994).

### ***3.2.1.1 Opioidagonists and antagonists***

The individual substances have different affinities to the individual receptor types and can develop or block effects there. Thereby some opioids specifically affect only one receptor type; others affect them unspecifically or influence all of them.

If a substance has an activating effect on a receptor while docking on, it is called opioidagonist. For example morphine and heroin are mere agonists and thus cause intensive pain killing but also respiratory depression.

Opioidantagonists also bind to receptors but do not stimulate them. Thus they are blocked up and therefore agonists can temporarily not bind to them. This means that antagonists can block the effects of agonists or even nullify them. For example naloxon nullifies the effect of morphine and heroin, a fact which is used in emergency medicine for the treatment of opioid overdoses (e.g. heroin overdose in case of addicts).

Agonists stimulate the receptor and change the structure of the receptor proteins so that a signal is transmitted through the membrane of the cell. Opioidagonists are heroin, methadone and endorphin.

Partial agonists have only partly agonistic effects on the receptor. Even in high doses they have a much lower effect than pure agonists. Partial opioidagonists are buprenorphin and pentazocin. Pure opioidantagonists are naloxon and naltrexon and these have no effect on the receptors (Seidenberg, 1998).

### 3.3 Endogenous Opioids

The term *endorphin* is a blend of „*endogenous morphine*“ and is an opioid that is produced in the human body. It was firstly detected by the Scottish researchers John Hughes and Hans Kosterlitz in 1975. At that time the scientists looked for the natural ligands for the receptor types of the brain on which also exogenously taken opioids dock and that were detected independently by S.H. Snyder and C.B. Pert, L. Terenius and others in 1973. From a chemical point of view they are short neuropeptides that bind to opioid receptors. The most famous endorphins are  $\alpha$ -,  $\beta$ - and  $\gamma$ -endorphin.  $\beta$ -endorphin seems to be most effective concerning pain suppression.

Endorphins control feelings like pain (analgesia) and hunger. Hollmann & DeMeirleir (1988) found out that under maximum physical strain there is a significant rise of the endorphin concentration in the blood plasma. Test persons reported about reduced pain perception and raised spirits. If, however, endorphin receptors were blocked by Naloxon, pain perception increased and mood deteriorated. Furthermore it was detected that endorphin may alleviate chronic pain, but not acute pain (Stoll, 1997).

Endorphins are connected to the production of sexual hormones and are made responsible (among others) for the arousal of euphoria. Furthermore endorphins lead to an increased release of dopamine. However, recent researches indicate that the beta-endorphin released from the hypophysis into bloodstream binds to opioid receptors but does not cause analgesia. But this does not mean that beta-endorphin cannot have an analgetic effect in other tissues or in the liquor cerebrospinalis (it just could not be verified explicitly so far) (Zehenbauer, 2003).

Certain exercise or experiences of pain could possibly cause a state of happiness due to the release of endorphins. This effect is undisputable in medicine by now. If one studies, however, the empirical research in this field conducted by Wagner (1993) and Schlicht (1994), one finds out that the rise of endorphin is only significantly notable in the case of well trained athletes. In other cases it can even come to a lowering of the endorphin level after physical exercise. It is however questionable whether a noteworthy number of opiate addicts

can be transformed into athletes during the few months of inpatient therapy (Zehentbauer, 2003).

Even if Schlicht (1994) notes that endorphin secretion increases in athletically well-trained as well as in untrained persons under maximum as well as under low physical strain, it is a fact that it depends on the concentration of duration and intensity of exercise. Statistically noteworthy beta-endorphin increase is only measured for exercise that lasts for half an hour at least (Stoll, 1997).

If one considers endorphin theory as explanatory model for euphoric changes of mood by means of exercise, under strict pharmacological as well as scientific points of view this approach becomes less and less important. Endorphins are only one factor among many others that play a role in human mood regulation – and despite all similarities concerning the potential spectrum of effects, endogenous morphines are not identical with opiates such as heroin or methadone (Stoll, 1997).

### **3.4 Substances**

About 30 different opioid effective substances are registered as medical drugs in Austria and thus available as such. On the whole there are far more legal and illegal opioids. Relevant opioids that are either used as drugs and/or used in substitution therapy are: Morphine, codeine, heroin, fentanyl, methadone, Levo-Alpha-Acetylmethadol (LAAM) and buprenorphine (Fischer, 2002).

Today in substitution therapy most frequently methadone, retarded morphine and, since lately, buprenorphine are used (Plattform Drogentherapien, 2008).

## **4 Effects and side effects of opioids**

The lines between the effects desired by patients (“flash”), therapists (appease the desire for drugs) and side effects (in particular of intoxication) are blurred.

Effects and side effects of opioids depend on the dose and can change in case of tolerance development. There are only few data in literature about the frequency of side effects listed below. Most side effects that occur regularly are innocuous (e.g. constipation and dry mouth). Some of the side effects listed occur only rarely, many of them only in connection with the consumption of the illegal drug heroin. Quantity and quality of effects and side effects partly correlate with the degree of opiate habituation, which means they decrease in frequency and intensity in the case of chronified consumption (Springer, 2003).

### **4.1 Effects**

The effects of opioids are euphoria, analgesia (alleviation of pain), calming effects and unspecified antipsychotic effects, anxiolysis (reduction of states of anxiety), anti-tussive effect as well as the prevention of withdrawal symptoms in case of opiate habituation (Gölz, 1999; Springer, 2003).

It is also the aim of osteopathic treatment to have a pain alleviating and calming effect by means of relaxation and thus to stimulate the parasympathetic nervous system. A reduction of withdrawal symptoms during opiate withdrawal by means of osteopathy would thus be easily conceivable.

### **4.2 Side effects/ undesirable side effects**

*Most frequently observed side effects* correspond to the typical opiate side effects, namely constipation, nausea and histamine-related side effects, as well as sedation, in particular when consumed together with sedative substances (benzodiazepines) (Seidenberg, 1998; Gölz, 1999 Springer, 2003).

A complete description of the side effects of opioids was collected and summarized by Springer (2003). Other authors only mention the most frequent side effects.



*Possible side effects* of injectable heroin are histamine-like skin irritations (wheals, redness, itches, stitching pain), headache, feelings of heat, pulsation in the head, goose pimples, dyspnoea, nausea, general uneasiness and states of collapse. Very occasionally epileptic-like fits may occur.

As *severe side effects* epileptiform fits, thrombocytopenia, blackouts, arrhythmia and orthostatic collapse are listed (Springer, 2003).

In 1992 the Swiss Federal Council passed a decree about the promotion of the scientific concomitant research concerning drug prevention and an improvement of living conditions of drug addicts. This decree was the legal base for the development and execution of the project for medical prescription of narcotics, i.e. giving heroin to addicts. During the observation period of six years and the treatment of about 1700 patients in the framework of this Swiss heroin project, in which only pure DAM (heroin) was given away, only few of the side effects mentioned below could be observed. Nevertheless they are mentioned in correspondence with other patient information leaflets of other drugs for the sake of completeness and sensitization of the prescribing doctors and nursing staff (Springer, 2003).

In terms of a systematic list, regardless of frequency, the following side effects could be observed:

Central nervous system:

Sedation, nausea, vomiting, headache, vertigo, miosis (which can lead to eyesight deterioration in case hypermetropia), libido disorder, concentration disorders, deterioration of cognitive functions and reactivity, EEG changes, respiratory depression (with a reduction of respiratory frequency and breath volume and consecutive hypoxemia), disorders of appetite regulation.

Vegetative nervous system:

Gastrointestinal- and urogenital-system:

Sweating, constipation, increased pressure in ductus choledochus and gall bladder, dry mouth, urine retention, effects on liver and kidney function, disorders in sexual function.

Histamine-related side effects:

Pruritus, urticaria, facial disorders, localized and generalized redness, swelling of limbs, swelling of face (Quincke's edema).

Cardiovascular system and respiratory tract:

Bradycardia, extrasystoles, hypotonia, syncope, peripheral vasoconstriction, pulmonary edema, bronchoconstriction, status asthmaticus.

Further side effects:

Changes in the immune system, muscular hypotonia, change of central temperature (hypo- or hyperthermia), tongue discoloration, certain endocrinological changes (gonadal and stress axis, ADH), tolerance development, mental and physical addiction (Gölz, 1999; Springer, 2003).

Furthermore in literature the following disorders associated with heroin consumption are mentioned:

Leucoencephalopathy, epileptic fits, cerebral ischemia, spinal myelopathy, myclonia, peripheral plexo- and neuropathy, nontraumatic rhabdomyolysis, cardiomyopathy, myocardial infarction, thrombocytopenia (Springer, 2003).

## 5 Neurobiology of addiction

Besides the explanatory models taken from psychotherapy, science furthermore tries to explain the effects of opiates on the human body via neurobiological and chemical processes. In neurobiology most recent findings from brain research are described. The effects of opiates happen mainly on the receptors of the central nervous system. The following chapter shall explain these brain processes in some more detail.

### 5.1 Elements of neurobiology

The nerve cells have junctions, so-called synapses, at which electrical discharge of the presynaptic cells are transmitted into chemical signals. These chemicals are transmitters, such as *dopamine*, *noradrenalin*, *acetylcholine*, *gamma-aminobutyric-acid (GABA)*, *glutamate* and *serotonin*. It is important to consider that one cell has got a few thousand synapses so that the functioning of a cell is determined by the relative weight of the individual transmitter systems, which are misbalanced by the impact of, for example, opioids (Tretter, 2007). The complicated interaction of these six transmitter substances can be depicted with the aid of the “neurochemical mobile“, by means of which not only the neurochemical signal balance but also whole systems can be illustrated (Tretter, 2007).

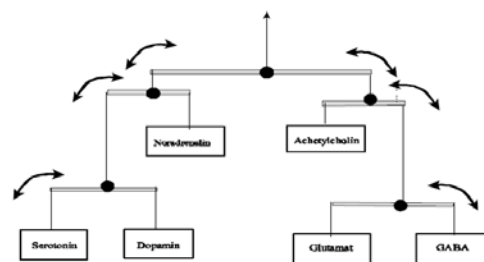


Fig. 1: The neurochemical mobile as a scheme for the dynamics of most important linked neurochemical transmitter systems in the brain – the mobile moves in a 24h rhythm (according to Tretter).

## **5.2 Neurobiology and opioid addiction**

The molecular structure of opioids is similar to the chemical structures of transmitters in the brain. This is why drugs can set on either on the receptors or, even more frequently, on the synapses while drift away and thus can unfold their effects (Handwerker, 1998).

The neurochemical mobile presented above, which allows a schematic representation of the interaction of the six most important transmitter systems, can also contribute to the understanding of certain aspects of addiction (such as the question of aggravated risk [anxiety, depression], acute effect, adaption in chronified consumption and withdrawal symptoms (Tretter, 2007).

The dopamine system plays an important role with regard to opioid addiction. Drugs that directly or indirectly activate the dopamine system, which projects from ventral tegmentum to the nucleus accumbens, cause states of pleasure (or reward, respectively) but also changes of the cognitive functions. This corresponds to the subjective experience of ecstasy. After repeated consumption, a higher dosis is needed because of neuroadaption and thus an automatism develops, which has to be regarded as reflexive habitualness at first and which is, from a neurobiological point of view, organized in the striatum where all other motor automatisms and behavioral routines are programmed as well (Tretter, 2007).

Prof. Jon-Kar Zubieta (University of Michigan, USA, principle researcher in the field of psychiatric Neuro-Imaging) presented the results of his research work on a conference of the European Association on Addiction Therapy, EAAT in Vienna in September 2007. By means of the so-called positron emission tomography (PET) Prof. Zubieta could observe the effects of opioids on the opioid system of the body. This system is an important biochemical regulatory circuit concerning addictive behavior. Opiates stimulate the organism to produce dopamine. Dopamine, in turn, is one of those factors that stimulate the production of opioid receptors. Thus the drug makes sure that the body can incorporate it as good as possible, that its psychotropic effect rises and that the feeling of loss is experienced as being even greater after the attenuation of its effect (Zubieta, 2007).

To sum it up: the neurobiological explanatory model is not unessential for the understanding of withdrawal symptoms. The effects of opioids on the dopamine system cause an automatism of opiate consumption as well as an auto-reinforcement of addictive behavior.

## **6 Addiction and dependence**

Addictive behavior does not only develop because of biological processes in the body but furthermore depends on personality traits and the social environment. All these factors may influence addictive behavior or may lead to substance addiction. The World Health Organization (WHO) has passed a classification and definition of dependence and addiction that is valid worldwide.

### **6.1 Classification of the WHO**

The International Classification of Diseases (ICD) is published by the WHO. The current version of the ICD is called ICD-10. It is the aim of the ICD to make possible a worldwide research of morbidity and mortality with international systematics. The German translation of ICD is published by the Deutschen Institut für Medizinische Dokumentation und Information (DIMDI) [German Institute for Medical Documentation and Information].

Dependence on psychotropic substances is recorded in chapter 5 (mental and behavior disorders due to psychotropic substances] of the ICD. This section contains a big number of disorders of different severity degrees with many different clinical presentations. What they all have in common is the use of one or more psychotropic substances (with or without medical prescription) (Dilling, 2000).

### **6.2 Definition of the WHO**

The World Health Organization (WHO) has published two definitions:

The first definition dates from 1957 and describes addiction as a state of periodic or chronic intoxication, produced by the repeated consumption of a natural or synthetic drug and is characterized by four criteria:

An overwhelming desire or need (compulsion) to continue taking the drug and to obtain it by any means, a tendency to increase the dose, some degree of psychic and often also physical dependence on the effect of the drug and a detrimental effect on the individual and/or on society (Institut für Suchtmedizin, 2006).

The second definition which was published in 1991 is somehow an extension of the original definition. It does not include the term addiction any longer; according to the WHO it should be substituted by the term dependence (Institut für Suchtmedizin, 2006).

*„Drogenabhängigkeit ist ein Zustand psychischer Abhängigkeit oder ein Zustand psychischer und körperlicher Abhängigkeit von einer Substanz mit zentralnervöser Wirkung, die zeitweise oder fortgesetzt eingenommen wird.“ Weltgesundheitsorganisation (WHO) (Plattform Drogentherapien, 2008).*

[Drug dependence is a state of psychic dependence or psychic and physical dependence on a substance with central nervous effect which is taken on a periodic or continued basis.]

### **6.3 Dependence on opioids**

The dependence on opioids is a multifactorial phenomenon. A daily consumption of opioids causes bodily dependence after a short time which display as withdrawal symptoms after consumption is discontinued. Opioid withdrawal symptoms can be prevented by the use opioidagonists (substitutes). The withdrawal syndrome is a whole complex of symptoms of different composition with alternating severity degree in case of relative or absolute withdrawal of the substance that has been consumed repeatedly and most frequently for a longer period of time and/or in a high dose. Start and progress of the withdrawal syndrome are limited in time and depend on the substance as well as on the dose that was consumed immediately before withdrawal (Seidenberg, 1998).

**Neurobiology** detected that reasons for addiction can be found in the brain, too. They were able to define those nervous circuits in the brain that are generally involved in the phenomenon of substance addiction and the most important receptors for these agents were cloned. With new imaging techniques (PET) the neurobiological mechanisms that transform a normal brain into an addicted one are detected, in order to develop a therapy that could probably reverse or compensate these factors in the future (EDAB, 2003).

EDAB (2003) regard the main features of addictive behavior as deviations in the normal decision making process, which are caused by a disorder in that brain circuit that is responsible for our emotions.

The synonymously used term behavioral dependence or behavioral addiction implies that reward for the brain is reward, regardless if the secondary intensifiers are pharmacological substances that directly affect neurotransmitters such as the dopaminergic reward system (Everitt, Dickinson, & Robbins, 2001; Grüßer-Sinopoli, 2006).

The **psychic aspects** of dependence are a fascinating research topic. Several research teams deal with two elusive factors that can increase the risk for abuse or dependence. Recent research indicates that expectancy (a special state of psychic and neurological excitement) as

well as the “trigger” for consumption can evoke a desire for the drug, which in turn can lead to drug abuse on the part of susceptible persons. These psychological factors may be deeply rooted inside of us and could be related to character traits such as aggression and impulsivity (EDAB, 2003).

The National Institute on Drug Abuse stated that *„Wissenschaft gezeigt habe, dass lang andauernder Drogenkonsum zu signifikanten Veränderungen der Hirnfunktionen führe, die auch lange Zeit nach Absetzen der Drogen bestehen blieben. Diese durch die Drogen hervorgerufenen Veränderungen der Hirnfunktion können verschiedene Konsequenzen auf der Verhaltensebene haben, einschliesslich [sic.] dem Bedürfnis, trotz nachteiliger Folgen den Drogenkonsum weiterzuführen – das entscheidende Charakteristikum der Abhängigkeit.“* (NIDA, 2002).

[science has proofed that long-term drug consumption leads to significant changes of the brain functions, which even remain for a long time after discontinuation. These changes caused by drugs can have different consequences on the level of behavior, including the desire to continue taking drugs in spite of negative consequences, which is the crucial characteristic for dependence]

## **6.4 Addiction**

From a psychological point of view the term addiction can be defined as the desire for an inner state that was experienced positively and thus leads to a repetition of the according behavior. This behavior deviates from prevailing social conventions and manners and thus is generally regarded as negative. This is why addictive behavior can obtain a problematic character. Addictive behavior is always bound to an object, it can focus on different objects, whether they are "incorporatable“ or not (e.g. anorexia, work addiction, gambling addiction, uncontrolled desire for sexual satisfaction) (Voigtel, 1996).

What makes withdrawal so hard for opiate consuming patients, are mainly the two factors dependence and addiction.

## 7 Withdrawal

There are different ways out of opiate addiction: withdrawal therapy is one of them. What happens thereby is a mere physical withdrawal. If there is not physical dependence anymore, addiction can be kept under control (Plattform Drogentherapie, 2008).

Withdrawal from opioids can be one of the lengthiest withdrawals. Very often the withdrawal syndrome seems weary because of the long period of time it lasts. The last main drug consumed before withdrawal influences the progress of withdrawal as well as the use of the different treatment patterns (Höld, 2003).

### 7.1. Withdrawal symptomatology

Withdrawal symptoms are receptor-specific reactions. If the usual dose of opioid is not taken, endogenous opioid peptides are not sufficient any longer in order to stimulate the reduced number of receptors as strongly as did the accustomed dose before. Due to the lapse of the opioid inhibition of peripheral catecholamine release in adrenal medulla and locus coeruleus of the brain stem, during withdrawal big amounts of adrenaline and noradrenaline are released. These stress hormones are mainly responsible for the unpleasant feelings during withdrawal. Withdrawal symptoms are partly based on an auto-intensifying mechanism (Seidenberg, 1998).

As we know from experience, withdrawal symptoms are counter-images of the main effects of the single substances. These observations could be verified by neurobiology. In case of opiates, opioids and tranquilizers a bodily counter-regulation prevails (Höld, 2003).

As far as the abstinence syndrome is concerned, vegetative symptoms such as sweating, chills, shivering, nausea and vomiting up to severe pains in limbs and abdomen, furthermore yawning, agitation, rhinitis, muscle cramping, diarrhea, states of anxiety, high temperature, inappetence, sleeping disorders, tachycardia and arterial hypertonia are the most frequent symptoms. These symptoms start about six hours after the drug was taken for the last time and last about as long as one week (Springer, 2003).

From a neurobiological point of view, scientific and medical practices concerning addicts still mirror a necessity of going further than the mere palliative treatment of withdrawal symptoms. Neurobiology includes genetic, environmental and social factors, as they assume



that treatment is more effective if as many as possible aspects of the disease are identified and thus treated (EDAB, 2003).

A holistic neurobiological view of addiction has existed for a few years now. It deals with the impaired interaction of different macro-anatomic circuits. Besides the brain stem-near impulse system, which consists of the dopamine- and the serotonin-system, additionally a “behavioral-system” is differentiated, whose centers are in the striatum. It is superordinated by a too indistinctly localized “reflective system“ (Tretter, 2007). In neurobiological descriptions of addiction, in general three features can be found. Snyder (1989) even calls it the biological triad of addiction development. The features are tolerance development, characteristic psychic and partly physical withdrawal syndromes and the strong need (craving), which seems to accompany drug consumption and is held responsible for the risk of relapse. What has been examined in detail are the possible points of application in the brain, concomitant behavior as well as medicinal treatment options for the alleviation of symptoms and a decrease of relapse frequency (Wolf, 2003).

## **7.2 Methods of withdrawal treatment**

*„Zweifelloos wäre es das beste, keine Opioide (mehr) zu nehmen. Wir Ärzte und Therapeuten mussten lernen, dass nur eine Minderheit der süchtigen Patienten das im gegebenen Moment, zum Beispiel heute, kann“ (Seidenberg/Honegger, 1998, S 82)*

[Doubtlessly it would be the best not to take opioids (any longer). We as doctors and therapists had to learn that only a minority of addicted patients can do so at a given point of time, e.g. today.]

Drug addiction and diseases in connection with drugs have increased during the last decade and thus have led to a further development in the field of drug therapy. Was it in the past abstinence (withdrawal) that was to the fore concerning therapy approaches for opiate addicts, nowadays it has been complemented by substitution therapy. The admission of legal oral substitutes eases the abandonment of illegal opioids/opiates (Plattform Drogentherapien, 2008).

Qualified and long-lasting treatment and care is the best measure against the high morbidity and mortality of opioid addicted patients (Dole, 1988).

Concerning the methods applied there are drug-supported and not drug-supported withdrawal treatments.

### **7.2.1 Abstinence (Withdrawal)**

In case of not drug-supported withdrawal relaxing techniques and methods are of great importance. This is based on the assumption that withdrawal symptoms are in a large part caused by stress. Massages, contrast baths, sauna, aroma therapy, different relaxing techniques such as autogenic training and progressive muscle relaxation are being applied. In particular ear acupuncture according to the NADA-protocol has proofed to be effective. Homeopathy, light therapy and methods of biofeedback as well as certain anti-anxiety methods can be applied very well.

As further abstinence treatment osteopathy, too, can be applied, as by means of the individually adapted osteopathic treatment it was possible to raise the patients' physical well-being.

Mere abstinence therapy promises biggest possible therapeutic success only for a minority of patients. Most withdrawal attempts and directly abstinence-oriented treatments fail and only turn out successful after many tries (Gossop, 1987, 1989, Soyka, 2006). Only a small number of opioid addicts is even ready to give abstinence treatment a try (Seidenberg, 1998). The most important concern of abstinence-supported therapy has to be the offering of a wide range of therapy options, from which each and every patient can choose the appropriate method (Uchtenhagen, 2006). According to all knowledge permanent or long-term drug-freedom is not higher than 20-30% even after inpatient treatment. Thus relapse is a frequent clinical reality (Soyka, 2006).

Although meanwhile the "state of the art" addiction therapy no longer calls abstinence the only goal of therapy (overcoming of abstinence paradigm), it is certainly the case that it still roots so deeply and dominantly in the therapeutic thinking that it has become impedimental for further developments in addiction therapy (Madlung, 2006)

### **7.2.2 Substitution therapy, maintenance therapy**

Substitution is a pharmacological form of therapy for opiate addicts and improves the chance for later abstinence. Substitution is useful in cases of opiate addiction because one had to assume that a certain percentage of addicts could never get away from illegal drugs. Harm reduction, decriminalization, and reduction of HIV and hepatitis B/C contagions etc. should enable the addict to create a social basis and are further goals of substitution therapy. By means of incorporating them into a routine of daily work and by having a regular salary, substituted patients shall become members of society again and thus become reintegrated step by step (Plattform Drogentherapien, 2008).

Substitution (or maintenance) therapy has existed as an alternative to withdrawal therapy in Austria for 20 years by now. Actually the term means that endogenous substances are substituted when the body is not able to produce them anymore. In such cases one tries to substitute these substances with an adequate dose and a substance that is as similar as possible to the endogenous one (Plattform Drogentherapien, 2008).

Because substitution therapy is not only a harm-minimizing form of treatment in terms of substituting unsanitary, uncontrolled and risky forms of consumption of illegal opiates and thus a prevention from breaking the drug law, but also helps patients with a new orientation concerning lifestyle towards a socially integrated, responsible, uncriminal life which shall improve the chances for later abstinence, a psychosocial or psychotherapeutic guidance is advisable (b.a.s., 2008).

A 12-month study by Woody et al. (1987) showed that progress was better if methadone-substituted patients were accompanied by psychotherapy, however no differences between behavioral therapeutic and depth psychology therapeutic approaches could be found.

These offers span the whole medical treatment model and range from low-threshold survival aid and basic supply to high threshold withdrawal treatment. At the moment the main focus lies on a treatment concept including substitution therapy, however there is no extensive offer for psychosocial accompaniment, consultation and psychotherapy. This fact is verified by empirical data of addiction aids of the Styrian Society for Addiction Issues.

It is common currency which is scientifically backed by studies (Woody, 1987; Fischer, 2002, 2006) that substitution treatment is only successful if there is a capacious treatment concept. Thereby one means medical treatment with simultaneous psychosocial accompaniment (b.a.s., 2007). Opioid maintenance therapy requires, in analogy with most psychiatric diseases, a permanent psychopharmacological treatment with concomitant psychoeducative therapy at best (Fischer, Kayer 2006). The treatment of substance addiction on opioids is primarily the task of psychiatrics (Fischer, 2002). The long-range objective is still drug freedom, which means also freedom from the opioidagonists prescribed. What has taken root, however, as state of the art is a long-term maintenance therapy with concomitant psychoeducation. If freedom from additional substances (legal or illegal) is achieved within a reasonable period of time (which can last for many years or even decades) a slow and gradual reduction of the opioid dose prescribed can be initiated (Fischer, Kayer, 2006).

The central point of the panel discussion of an Austrian group of experts in May 2006 was that access to therapeutic supply has to be eased, that treatment options have to be extended (Haltmayer, 2006) and that it is crucial that as many opiate addicts as possible have to be

reached by adequate therapeutic supply (Springer, 2006). Furthermore they agreed that the quality of therapy for opiate addicts has to be increased and that access to abuse has to be reduced. Fact is, however, that a certain percentage of patients has a relapse and cannot permanently get away from illegal drugs (Barazon, 2006 (a)).

Concerning the call for more treatment options for opiate addicts, this top-class panel of experts agrees. It is out of question that maintenance and substitution therapy with synthetic opioids (methadone, buprenorphine, retarding morphines) is important and useful. Because untreated patients are the greatest danger for themselves as well as for society (only one quarter of all opiate addicts in Austria are currently under treatment). Every patient is an individual and thus has to be treated individually. Together they call for the extension of individual therapy and substance options and an up-to-date research of other modes of application (inhalative, intravenous) as well as the discussion of places of consumption (Barazon, 2006 (b)).

Although in recent years there have been new and crucial results in the field of addiction research, the dependence on illegal drugs is still a highly political topic. Therapy schemes are still influenced by political positions rather than by medical data (Fischer, 2002).

The national drug coordinator of the Republic of Austria says that the government department works on extending and improving the drug aid system. But on a political level budgetary aspects have to be taken into consideration as well, in order to secure the application of the so-called “four-pronged model” – which means a balanced drug policy from prevention to therapy, harm reduction and repression measures (Pietsch, 2005). In spite of the efforts of the government department in drug policy many facts are ignored and if politics reacts it is mostly too late. To mention only one example: despite several conferences of the federal advisory council for drug issues, the second drug ambulance of Graz has remained closed for one and a half years by now, although there would be the need for three such ambulances (Berthold, 2008).

Dr. Fischer, head of the drug ambulance in Vienna, furthermore stresses that it is worrying that the state defines and determines which drugs may or may not be prescribed (Barazon, 2007). Like this the extension of therapy options and substance offers is prevented.

The use of drugs in withdrawal therapy shall support the anxiety-reducing strategy in withdrawal treatment. Therefore the right dose for covering the aspects symptom treatment, anxiety reduction and suppression of the patient’s desire for drugs has to be found. The

medical concept of substance therapy consists of pain killers that either contain or are similar to opiates, whereby the initial dose shall be as low as possible and reduced twice to thrice a week for a period of two to three weeks or the reduction scheme of methadone of retarding morphine is applied. Hereby first of all the dose of the substitute is ambulatorily reduced to a lowest possible dose. After that the withdrawal scheme mentioned above is applied (Seidenberg, 1998; b.a.s., 2008; Haltmayer, 2006).

#### **7.2.2.1 Methadone**

As methadone is used at the rehab ward “Walkabout“ as drug substitution on the one hand and on the other hand it is also the most frequently used, though not undisputed, substance used in drug substitution, the following paragraph shall deal with it in some more detail.

Methadone maintenance treatment was established by Vincent P. Dole and Mary E. Nyswander in 1964. Today it is the most widely accepted form of therapy for heroin addiction and is part of the medical treatment supply in approx. 40 states. The oral effectiveness of methadone lasts for 24 to 36 hours and causes a breakthrough of the 4-hour-cycle of euphoria and withdrawal symptoms that accompanies heroin consumption. Thus taking it only once a day is sufficient in order to appease the “hunger for drugs” by means of occupying opioid receptors (Giacomuzzi, 2001).

Methadone supported substitution treatment is especially important for opioid addicted patients who cannot be treated in a promising way otherwise and methadone is the best field-tested substance to reduce highest risks for a big number of opioid addicts (Seidenberg, 1998). This is proofed by a study by Giacomuzzi et al (2001), which evaluated subjective well-being and somatic features of methadone substitution of 61 patients with the ICD-10 diagnosis “heroin addiction”. Statistically striking differences can be found concerning drug-specific side effects, somatic satisfaction scales and additional medication and drug consumption as well as psychic states.

All studies conducted so far in Switzerland, the Netherlands, Germany, Spain and Canada have in common that they are based on the observation that methadone treatment *is* the prevailing substitution treatment but that its acceptance and effectiveness are clearly limited. This is documented in international literature as well as visible in many different European treatment systems (Nadelmann et al., 1997; Springer, 2003).

Qualitative studies of patients in methadone programs indicate that methadone treatment has certain fundamental weaknesses from the perspective of the patient which results in the fact that many patients do not perceive it as a satisfying and effective long-term substitution

therapy. Patients claim that there certain, partly very unpleasant, side effects such as sweating or a gain of weight when they take methadone for a long time and stress the importance of individual and social injection rites and of psychological and sensational effects transmitted by injection that are, however, missing in oral opiate therapy. Furthermore they state that they continue to obtain illegal enhancer drugs on the street market which is due to the lack of the missing effects of euphoria of methadone (Springer, 2003).

Results from Madlung et al. (2006) proof first studies about reduced additional consumption during substitution treatment with retarding morphines compared to treatment with methadone as well as their good acceptance on part of opiate addicts. After 20 years of experience with methadone treatment and in spite of all its advantages it still has to be looked for other solutions for those patients who do not respond to or accept methadone therapy. Efforts to establish diversified substitution programs foot on this insight (Springer, 2003). This includes a broader range of therapeutic supply with as many different approved methods of treatment as possible – also from the area of complementary medicine, as, for example, osteopathy.

### **7.2.3 Substitution in Austria**

This work is mainly concerned with drug therapy in Austria. Because this study is conducted in Austria, the following paragraph shall describe the specific situation of substitution therapy in Austria. Currently there is a peak of drug substitution therapy in Austria. In 2005 more than 7.500 (7.554) opiate addicts were under drug substitution treatment, which is an all-time high. In comparison: in 1996, for example, 2.941 addicts were under drug substitution treatment (ÖBIG 2006).

Since 1987 there has been a legally regulated possibility in Austria to treat chronic opiate addicts (heroin, morphine, opium and codeine compounds) by means of substitution therapy – as an alternative to immediate withdrawal therapy. Substitution therapy is an effective pharmacological form of therapy for opiate addicts and thus improves the chances for later abstinence. Substitution therapy could save the lives of many opiate addicts after fruitless abstinence therapies. Substitution indication and fine-tuning happens in drug ambulances or at specialist's offices which is followed up by drug prescription done by a specialist familiar with such treatment. Prescription attestation is made by a public health officer who carries out, together with the treating physician, the monthly urine control. A new substitution act (in force since 1st March 2007) shall secure the co-operation of addicts, treating physicians, public health officers, pharmacies and addiction counseling services as well as secure the framework for controlled release and thus prevent abuse of substitutes. (b.a.s., 2008)

### 7.3 Withdrawal at “Walkabout“

This study, which deals with the osteopathic treatment of opiate addicts in withdrawal, was conducted at the rehab ward “Walkabout” in Kainbach, near Graz which is under the direction of Prim. Dr. Werner Friedl. Already before admission first steps in terms of change of awareness are made there. This includes stabilizing consumption behavior and a change to methadone in case of substituted patients as well as measures which concern the immediate environment and life of the patient (debt regulation, house situation, familial circumstances,...) (Walkabout, 2008).

The detoxication therapy offered in the house offers patients a so-called “qualified withdrawal treatment“ which is state of the art in addiction therapy by now. This treatment exceeds mere physical detoxication and offers, besides detoxication, an integrated therapeutic approach. Elements of a “qualified withdrawal treatment” are besides medical diagnostics and therapy, psychotherapeutic one-on-one or familial appointments, group therapy, ergotherapy, creative therapy and exercise therapy. Further therapies and offers may be: psychological diagnostics, consultation of social workers, osteopathy, physiotherapy, light therapy, music therapy, hydrotherapy and alternative treatments such as relaxation baths and aroma therapy. There is no selection, no deterrent admission procedures, no derogative confrontation or motivation-checking thresholds (Qualifizierte Entzugsbehandlung, 2008; Fischer, 2002).

Withdrawal lasts for about three to four weeks and is intended for patients from sixteen years on. Firstly the methadone dose is fine-tuned; then tapered. Quite a few patients prefer a so-called blind-withdrawal, whereby they do not know anything about their daily dose or dose reduction, because they experience this form of withdrawal as disburdening (Walkabout, 2008).

In order to alleviate withdrawal symptoms, in the framework of “qualified withdrawal treatment“ acupuncture according to the NADA protocol (see chapter 2) is applied at “Walkabout”. Furthermore tea cures, baths, massages and physiotherapy are offered. In order to appease withdrawal symptoms the application of osteopathy is very useful in this phase, as it is very responsive to the manifold symptoms that are constantly changing and different from patient to patient.

After having taken his/her last dose of methadone the patient stays at the withdrawal area until his/her urine is absolutely drug free from all substances (amphetamines, barbiturates, benzodiazepines, cannabis, cocaine, methadone, opiates). Furthermore there is the opportunity of taking part in an aftercare-group for all patients who successfully completed withdrawal at “Walkabout”, which should help them to maintain abstinent. Crucial at this point is that now,

in everyday life (without the protection of the clinical environment), the meaning of the drug in one's own context of life is reflected and relativized at best (Walkabout, 2008).



## **8 Osteopathic treatment of opioid addicts**

The following chapter shall not necessarily explain and proof the effectiveness of individual osteopathic techniques. Although the osteopathic explanatory models do not rest on a scientific basis the following chapter shall describe them, as well as their possibly positive effect on the alleviation of withdrawal symptoms of opioid addicts.

Besides many osteopathic techniques for the alleviation of individual and momentarily acute complaints of the locomotor system, mainly techniques for improving circulation such as fluctuation techniques and sinus venosus techniques coming from craniosacral osteopathy and visceral osteopathy are applied.

All patients get only one osteopathic treatment. Throughout this treatment the body shall be supported at best according to the osteopathic basic principles of its founder Dr. Andrew T. Still.

To see the human being as a unit is the osteopathic principle of globality according to A.T. Still. The human being does not only consist of their physical body, but also their thought life, emotional and spiritual body. Consequently any disorder can affect the whole body. (Still, 1902).

The body has its specific alarm and defense systems. In the osteopathic literature one talks about activating the self-healing forces when the osteopath tries to mobilize these forces by means of techniques following empiric theories. (Still, 1902).

The human body constantly tries to bind, to detoxicate and to excrete toxins. Ceaselessly it searches for and identifies decaying or degenerated cells, abolishes them and replaces them with functional new cells. Harmful bacteria are attacked and specific antibodies are formed against them. (Hinghofer-S., 1994).

But these self-healing forces also depend on genetic factors as well as on environmental factors, nutrition, life style, mental health and social environment. Too many sickening influences – in the case of opioid addicts these are the substance or, while withdrawal, the absence of the substance – impair the ability for compensation and the body's defense.

### **8.1 Craniosacral techniques:**

According to Still's principle (1902) "rule of the artery" good circulation is highly significant. This includes, from an osteopathic point of view, the arterial, the venous and lymphatic

system as well as sympathetic and parasympathetic innervation. This does not only refer to an optimum supply of the tissue, but also to the evacuation of toxic substances.

Referring to opiate addicts this means that the year-long poisoning of the whole organism leads to a decrease of circulation and thus hinders the body from its tendency of self-healing and recovery. By means of so-called fluctuation techniques the therapist tries, according to Still (1902) and Liem (1998), to exert homeostatic influence to the whole liquid system and thus tries to support self-healing and auto-regulation of the body.

Sutherland (1990) developed techniques for influencing vital nervous centers. Most opioid receptors can be found in the CNS. If one proceeds from the assumption that craniosacral techniques can activate these nervous centers, a positive influence on withdrawal symptoms only by means of an increase of the endorphin concentration in the body fluids would be imaginable.

## **8.2 Visceral Osteopathy**

The body is in constant dynamic interaction with its surrounding environment. The gastrointestinal tract has got a very big surface, which functions as interface between inner and outer environment. The digestive organs are also called “emotional brain” by Möckel (2006), as many people react with symptoms in the area of the gastrointestinal tract to emotional impact. Factors such as anxiety, insecurity, but also to “earth“ and to “center“ are generally connected to the umbilical region.

The peripheral impact on the smooth musculature caused by opioids is, above all constipation, but also retarded voiding of stomach and urinary behavior. (Seidenberg, 1998).

Visceral osteopathy is concerned with the mobility and function of the inner organs and proceeds from the assumption that by means of particular visceral techniques an improvement of the function of the respective organ is achieved. This process of improvement of function needs time, which the body uses to apply its self-healing forces curatively. From experience it has become clear that the body often needs several weeks therefore, a fact which challenges the evaluation concerning improvement of symptoms by means of a checkup after 3-4 days in my study. (Barral, 2004).

The osteopathic diagnostic is based on percussion and palpation of the abdomen and the examination of the respective nervous plexus. Furthermore the involuntary movement of the organs (motility) is examined. The respective parietal structures such as lumbar spine, thoracic spine, diaphragm and pelvic base are also examined regarding restrictions. The osteopathic treatment happens individually, i.e. it will be adapted to the patient’s state and

symptoms. Thereby the function of the autonomous nervous system, in particular of the vagus nerve and the solar plexus, the mobility of the lower thoracic spine, the tension in the pelvic base and the function of small and large bowel are regarded (Möckel, 2004). As mentioned above, the gastrointestinal tract is the emotional brain and very sensitive. Direct pressure on the intestine is not advisable as it is, because of the large amount of feces and the toxins in it, overstrained anyway (Ligner, 2002). Thus treatments are applied slowly and softly; something which is emphasized for patients at “Walkabout”, too.

### **8.2.1 Bowel**

During opioid withdrawal patients suffer from diarrhea and abdominal cramping. Even under constant methadone dose during opioid-supported treatment very often irritable colon with changing consistency of stools, abdominal pains and flatulence can be observed.

Opioids paralyze the intestine musculature and very often cause constipations („narcotic bowel syndrome“). Stomach evacuation is retarded and intestinal passage time is elongated. Phenomena such as an increase of segmental bowel contractions, a rise of tonus of gastrointestinal sphincters, increased electrolyte and water reabsorption from the bowel, decrease of stool volume and defecation frequency as well as flatulence are observed. The laming caused by the opioid does not only cause constipation but can furthermore lead to anti peristalsis in the upper gastrointestinal system and thus nausea and vomiting (Seidenberg, 1998).

As water-binding agents and bowel mucosa irritating laxatives are theoretically dangerous and can, in combination with bowel paralyzation caused by the opioids, even lead to ileus, in such cases the alternative approach of osteopathic visceral treatment seems to be indicated (Seidenberg, 1998).

One of the most important treatments is the treatment of the peritoneum, as the peritoneum covers the whole abdomen and is topographically related to all intraperitoneal organs as well as to nearly all retroperitoneal and extraperitoneal organs. Furthermore the peritoneum belongs to the system of the central tendon thus in the peritoneum fascial reactions to further cranially or caudally localized dysfunctions are possible (Hebgen 2004). In general, one might say that organ mobility is good when the quality of the peritoneum is good.

Nearly all patients a “Walkabout” complain in the anamnesis about stomach/abdominal cramps and a feeling of tension in the abdomen in combination with constipation and/or diarrhea, whereby an increased tension and pain sensation during palpation and test occur in the same frequency. As treatment techniques those techniques seem to be appropriate

techniques, which either work directly with the stretching of the tissue or indirectly with the approximation of the tissues to the painful areas or the areas of increased tension.

As in the case of all opiate addicts stool irregularity plays a role it is furthermore useful to test and treat the colon osteopathically. Therefore the treatment model of soft mobilization of the caecum and the sigmoid by means of a strain in direction of the navel is well applicable (Hebgen, 2004).

### **8.2.2 Liver**

The liver metabolizes all three basic elements of nutrition (carbohydrates, fats and proteins) in different ways and thus plays an important role in intermediate metabolism. Besides these functions the metabolic function of the liver, including degradation and evacuation of exogenous toxins, as for example of medicines or drugs in case of substance addicts, is highly important as well (Hinghofer-S., 1994). Some of the in-patients at “Walkabout” additionally suffer from chronic hepatitis C. Hepatitis C is an infectious disease caused by the hepatitis C virus. It is characterized by a high rate of chronification (up to 80%), which can lead, in the course of disease to severe liver damage, such as liver cirrhosis or liver cell carcinoma.

Infection happens parenterally via the blood, thus there is an increased risk of infection for those drug consumers, who consume drugs intravenously and share the same needles with others. Hepatitis C is an infectious disease which is often not diagnosed during the acute phase, which is due to the mostly asymptomatic or symptom poor progress of disease (in 85% of cases). After an incubation period of 20 to 60 days many affected patients perceive it as a sort of common cold or, in many cases, do not even perceive it at all (Maier, 1998).

Methadone, which is used at “Walkabout“, is degraded in the liver. Opiates, methadone and most synthetic opioids are metabolized in the liver into glucuronic acid conjugates and afterwards excreted via the kidneys. Furthermore also opioid applications and opioid withdrawal have an inhibiting impact on the immunologic parameters (Seidenberg, 1998).

In case of considering increasing the metabolic activity of the liver and thus stimulating immune defense via the liver it is useful to osteopathically test the liver of every drug patient beforehand and to indirectly mobilize in case of increased tension or to indirectly treat the motility of the liver. Additionally one can apply a two-handed soft and intermittent oscillation on the liver, as this technique should have, according to osteopathic literature, a good circulatory effect (Hebgen, 2004).

### **8.2.3 Kidney**

Part of the kidney's tasks are the regulation of water and electrolyte balance, of the acid alkaline balance, blood pressure regulation, hormone production, the degradation of peptide hormones, as well as the elimination of substances which are obligatory excreted by urine and exogenous substances, which means medicine and drugs (Hinghofer-S., 1994).

Opiates, methadone and most synthetic opioids are metabolized into glucuronic acid conjugates and after that excreted via the kidneys (Seidenberg, 1998).

In the adrenal cortex among other things cortisol, also called hydrocortisone (not to be confused with cortisone which is the inactivated form of cortisol), a steroid hormone, which belongs to group of glucocorticoids is produced. The release of cortisol from the anterior lobe of hypophysis is stimulated by adrenocorticotropin (ACTH). Opioids increase the plasma cortisol level. Various endocrine opioidal effects lead to an increased blood sugar level. Under the influence of opioids the effect of insulin is retarded and released in a minimized way, thus an increased desire for sugar can be observed in opioid addicts. Furthermore opioids inhibit the release of adrenaline and noradrenaline in the adrenal medulla as well as in the locus coeruleus of the brain stem which affects withdrawal symptoms. The uninhibited release of adrenaline is in parts responsible for the painful symptoms during opioid withdrawal (Seidenberg, 1998).

As during withdrawal patients generally are very sensitive to pressure on the abdomen, above all a soft treatment by means motility movements of the kidneys with the hands anterior and posterior above the renal bed is recommended until a clear improvement of motility is palpable (Hebgen, 2004).

By means of this treatment the renal and adrenal function shall be activated, which shall thus lead to an improved excretion of toxins as well as to a stimulation of the adrenal cortex to a normal hormone production (Hebgen, 2004).

### **8.2.4 Lung**

There are many different reasons why drug addicts often suffer from diseases of the respiratory tract and of the lung. What is striking is that most opiate addicts are heavy, nicotine-dependent smokers and say in anamnesis talk that they consumed cannabis nearly daily in the last year before the withdrawal. Very often patients at "Walkabout" say that they suffer from bronchitis.

Harmful are in this case, above all, the local effect of the substance itself, tar and other harmful substances of cigarette smoke and the systemic substance effects of drugs such as cough attenuation and aspiration (Seidenberg, 1998).

As patients got only one treatment during my study, in none of the cases the lung was treated, as a general stimulation of the self healing forces according to A. T. Still's principles seemed to be of utmost importance. However, very often chest, thoracic spine and ribs were mobilized in order to work on the improvement of the patient's posture.

### **8.3 Posture**

One's posture is an active achievement which is not only influenced by the musculoskeletal system but also by psycho-emotional factors. Furthermore the patient's posture can reveal areas of strong tension to the osteopath (Liem, 2002).



Abb. 2: Typical posture of an opiate addict

In order to bring about, besides a chest and rib mobilization, also a vegetative balance according to the osteopathic model, very often the so-called rib-raising technique is used. In addition to sympathetic stimulation thereby the sympathetic trunk ganglia which are located anterior to the heads of ribs are stimulated (Hebgen, 2004). The autonomic (vegetative) nervous system regulates many bodily functions in the sense of maintaining the internal environment (homeostasis) and the adjustment to constantly changing demands of the environment of the organism (Hinghofer-S., 1994).

#### **8.3.1 Diaphragm Techniques**

Work on the diaphragm always also leads to vegetative balance on the solar plexus and by means of stimulation of the sympathetic trunk Th 7 – 10 to vegetative balance of the sympathetic nervous system and by means of stimulation of the vagus nerve to vegetative balance of the parasympathetic nervous system which is due to the topographic neighborhood. What is meant by vegetative balance in osteopathic literature is a stimulation of

parasympathetic nervous system and/or sympathetic nervous system by means of many different osteopathic techniques. Mostly indirect diaphragm techniques and mobilizing pressure to the lower thorax in translation to the lower ribs should lead to a functional improvement of the diaphragm (Hebgen, 2004, Möckel, 2004).

If the vegetative system is balanced due to generally regulating, unspecific effects, the organism can better compensate specific disorders on a mental (concentration), bodily (power) and emotional (courage) level (Raben, 1999). According to the holistic osteopathic treatment this would be a desirable goal.

## **9 Methodology**

### **9.1 Match-Control**

The Match-Control method is applied in case of low compliance.

Compliance means the willingness and ability to cooperate. By means of compliance the therapist focuses on the cooperation of the patient. Due to many facets of drug addiction cooperation between patient and therapist is mutually limited (Seidenberg, 1998).

The delinquency rate is rather high and only eight to ten patients can simultaneously take part in inpatient withdrawal at “Walkabout“. This means over a period of several months as many patients as possible are treated. They fill in the questionnaire for the first time straight before the osteopathic treatment and for the second time three to four days after the treatment. This enables the therapist to judge the patients‘ condition on the day of the treatment and, in addition to that, to find out about certain disorders, such as, among others, sleep disorders or digestive problems a few days after the treatment.

All in all as many patients as possible are admitted to the test as well as to the control group during the period of treatment. All patients in either test or control group who correlate concerning age, duration of addiction, medication and consumer behavior (concomitant use) are compared.

### **9.2 Choice of patients**

The following patients took part in the study: all patients who are at the rehab ward “Walkabout“ from May to July and October to December 2007 and who either agree to be treated osteopathically or at least agree to fill in the questionnaire of the control group. Furthermore osteopathic treatment is prescribed by means of medical recommendation during the doctors‘ ward round.

#### **9.2.1 Inclusion criteria**

All patients with necessary compliance who do drug withdrawal at the rehab ward “Walkabout“, which is part of the order’s hospital “Barmherzige Brüder” in Graz/Kainbach in the period of May to July or October to December 2007 are treated.

All patients included in the study voluntarily take part in the interrogation which is part of the study and they were illegally or substituted opiate addicted and had consumed drugs for two to three years before. In addition to that they partly also had a “Abhängigkeitssyndrom bei



multiplem Substanzgebrauch und Konsum anderer psychotroper Substanzen“ (ICD 10) [an addiction syndrome in connection with multiple substance use and consumption of other psychotropic substances]. For the examination only 17 test persons could be included. The test persons were individually fine-tuned to methadone as is usual in Kainbach. The dose is minimized insidiously. Pain killing drugs, sleeping pills and psychotropic drugs are administered if necessary.

### **9.2.2 Exclusion criteria**

Exclusion criteria were severe mental disorders or suicidal ideation on part of the test person as well as diseases in connection with which no osteopathic treatment is indicated. The final decision of who should be treated was made by the doctors on duty during their ward rounds. From Monday to Friday all patients at “Walkabout“ daily receive an ear acupuncture according to the NADA protocol. This is compulsory for all patients during the withdrawal period. Thus the original exclusion criteria “ear acupuncture during testing phase” was annulled again.

During the initial consultation patients are asked about severe diseases with organic manifestation, as for example hepatitis C. However, such diseases are not regarded as an absolute exclusion criteria, as the majority of patients suffers from a chronic disease and an exclusion of all those patients would not have led to any useful results in the foreseeable future.

### **9.3 Questionnaire**

As a questionnaire the validated OWS-form (Opioid Withdrawal Scale according to Bradley 1987) was used and, in addition to that Seidenberg with further questions about the effects of drugs and withdrawal, including 27 typical withdrawal symptoms in order to find out about the severity of withdrawal symptoms.

During the initial consultation questions about drug effects and withdrawal are answered either by the patients themselves or, if necessary, with the aid of the osteopath or the nursing staff. These questions include the date of consultation, the date of inpatient admission, name and age of the patient as well as medication prescribed.

Furthermore patients are asked about the consumption of alcohol, cannabis, amphetamines and ecstasy, cocaine and benzodiazepines during the last year. These questions are important in connection with the frequently polytoxicomane consumption behavior of drug consumers, as this fact often makes withdrawal even harder.

Response options are:

- no,
- now and then occasional,
- medium regular
- severe and constant consumption.

During the first consultation patients are furthermore asked about the number of previous withdrawals, relapses with illegal opioids, the duration of addiction in years and, as mentioned above, severe diseases with organic manifestation.

For answering the questionnaire referring to typical withdrawal symptoms, the following guidelines are given:

K = Keine Symptome, gar nicht = 0 (Bewertung in der Statistik) [no symptoms, never = 0 (rate in statistics)]

L = Leichte Symptome, etwas, gut auszuhalten = 1 [moderate symptoms, sometimes, easily bearable = 1]

M = Mittelmäßige Symptome, noch auszuhalten = 2 [medium symptoms, bearable = 2]

S = Starke Symptome, kaum auszuhalten = 3 [severe symptoms, hardly bearable = 3]

Contact is always established by means of conversation.

The validity of the OWS questionnaire is very good, as by means of the degree of severity of typical withdrawal symptoms the subjective sensation of the test persons can be precisely reproduced and compared. The reasonableness of the osteopathic treatment for the individual patients during withdrawal can be estimated very well, as the reduction of complaints means a higher motivation for bearing up withdrawal. If the physical well-being is increased, also the mental state is improved simultaneously. This is especially important in the case of opiate addicts even after the mere bodily withdrawal, as a good mental situation ranks among the main relapse prophylaxes (Fischer, 2002).

As the OWS questionnaire has already been used for measuring the patients' condition during withdrawal in many different studies, reliability (repeatability) is given. By using the OWS questionnaire, positive as well as negative examples can be found. In addition to that urine tests are carried out regularly at "Walkabout", in order to make sure that no drugs are taken during the inpatient stay.

## 10 Results

The hypothesis concerning the effect of osteopathic treatment of withdrawal patients is: One osteopathic treatment causes an improvement of the withdrawal symptoms of substituted patients compared against an untreated control group. The following chapter shall deal in depth with experimental procedure, experimental design, evaluation and interpretation (according to Bortz, 1984, 1999) of the results.

### 10.1 Experimental procedure

First the patients of the rehab ward “Walkabout“ were examined. All 34 inpatient drug addicts, who were slowly tapering from methadone, were examined concerning their withdrawal symptoms. The 17 persons of the test group (TG) were treated osteopathically once; the other 17 patients in the control group (CG) were not treated. The age of the persons examined was between 19 and 45. Thus the average age of persons taking part in this study was 27,41. Seven women of 30 years on average and 27 men of 26,74 years on average took part.

During the **pilot study** from May to July 2007 we tried to conduct four osteopathic treatments at an interval of one week. In the course of this pilot study, however, it became clear that hardly any patient stayed for several weeks. Reasons for dropout are manifold: abuse of forbidden substances, drinking of alcohol, breach of the house rules or self-determined termination, because withdrawal seemed too hard and the tolerance limit of being able to bear the symptoms is lower than the motivation to succeed. Or the lust for drugs is, after all, higher than the patient had assumed before.

This is also true for the patients at “Walkabout“, where the aim is an abstinence oriented treatment which is successful only in a minority of opioid addicted patients. Most drug withdrawal attempts and abstinence oriented treatments fail and are successful only after a number of tries (Seidenberg, 1998).

The time of collecting data about the patients‘ state of condition during withdrawal was thus limited to three to four days. Like this in July, as well as in October, November and December 2007, 17 patients of the test group and 17 patients of the control group could be asked.

Despite this limitation to a few days only, clear changes concerning typical withdrawal symptoms could be observed, although the methadone dose is normally tapered daily and thus symptoms are changing daily.

From time to time typical withdrawal symptoms occur more or less strongly, which can differ from patient to patient. The osteopathic treatment means interference in the normal withdrawal progress. The subjective sensation of the individual patients after the treatment is very positive. They feel immediately calmer, are more open concerning their contact to other inmates, their spirit is raised, symptoms such as tremor, shivering, chill and excessive sweating clearly improve. Patients with massive digestive disorders have a much better feeling in the abdomen straight after the treatment. Although these changes were important topics in the talk after the treatment, also on the part of the nursing staff, these immediate effects of the osteopathic treatment on the patients were not covered statistically in the study. In order to find out, whether these immediate positive effects of the osteopathic treatment that could be observed by myself as well as by the nursing staff leads to an improvement of the withdrawal symptoms in the longer run, the questionnaire was filled in again by the patients after three to four days. In the mean time patients were not treated osteopathically again. Withdrawal symptoms were measured by means of a questionnaire that was established on the basis of the OWS questionnaire.

## 10.2 Experimental design

The withdrawal symptoms of the persons in the test group as well as of the persons in the control group were examined by means of a pretest. After that the test group was treated and four days after the treatment a posttest of test group and control group was conducted.

t1	t2	t3
TG: Pretest CG: Pretest	TG: Treatment CG: -	TG: Posttest CG: Posttest

## 10.3 Evaluation

The higher the value that was picked on the OWS scale was, the heavier the withdrawal symptoms, which were measured by means of questionnaire items, were.

In the pretest the average value of the test group was 28,06 on the OWS scale; for the control group it was 25,71. The second measurement showed an average value of 15,59 for the test group and of 22,00 for the control group.

t1	t3
TG: 28,06	TG: 15,59
CG: 25,71	CG: 22,00

Figure 3 graphically depicts the results:

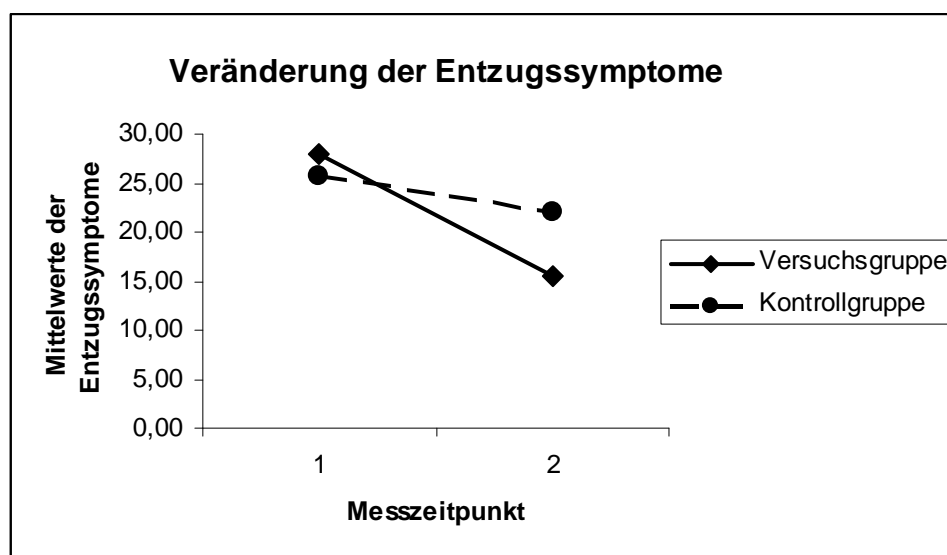


Fig. 3: Change of withdrawal symptoms

[left: average value of withdrawal symptoms  
middle: moment of measurement  
right: test group  
control group]

In order to find out whether the osteopathic treatment has a significant influence on the severity of withdrawal symptoms, a two-factor analysis of variance with repeated measures was calculated.

Factor A is thereby the osteopathic treatment (two-stage: treatment vs. non-treatment) and factor B signifies the repetition of measurement, i.e. the both moments of measurement (before and after the treatment).

In order to support the hypothesis of the effectiveness of the treatment on withdrawal symptoms, it has to come to a significant interaction effect AxB.

The following table shows the results of the two-factor analysis of variance with repeated measures:

<b>Source of Variation</b>	<b>Sum of squares</b>	<b>Df</b>	<b>Sigma2</b>	<b>F</b>
<b>A</b>	<b>70,015</b>	<b>1</b>	<b>70,015</b>	<b>0,256</b>
<b>in S</b>	<b>8748,706</b>	<b>32</b>	<b>273,397</b>	
<b>betw. Tp</b>	<b>8818,721</b>	<b>33</b>	<b>267,234</b>	
<b>B</b>	<b>1112,132</b>	<b>1</b>	<b>1112,132</b>	<b>15,903**</b>
<b>AxB</b>	<b>326,485</b>	<b>1</b>	<b>326,485</b>	<b>4,668*</b>
<b>BxTp</b>	<b>2237,882</b>	<b>32</b>	<b>69,934</b>	
<b>in.Tp</b>	<b>3676,500</b>	<b>34</b>	<b>108,132</b>	
<b>Total</b>	<b>12495,221</b>	<b>67</b>	<b>186,496</b>	

\*\* significant at the 99% level

\* significant at the 95% level

Fig. 4: Table of results of the two-factor analysis of variance with repeated measures

The interaction effect AxB is significant at the 95% level,  $F(1, 64) = 4,668$ ,  $p < .05$ . Thus one can proceed from the effectiveness of the treatment. If one compares the average values of the test group on the OWS scale before and after the treatment (28,06 and 15,59), the result is a highly significant effect ( $t(16) = 3,583$ ,  $p < .01$ ). This means that the osteopathic treatment is effective with an error rate of 1%. When comparing the average values of the control group (25,71 and 22,00) there is no significant effect ( $t(16) = 1,778$ ,  $p > .05$ ). Thus the withdrawal symptoms do not improve in the control group.

## 10.4 Interpretation

The study reveals a statistically significant effect of the osteopathic treatment. In accordance with the hypothesis stated beforehand, in the test group there is a decrease of withdrawal symptoms whereas in the untreated control group there is none.

What is striking is that only one treatment can lead to an improvement of withdrawal symptoms. Originally it was planned to treat members of the test group more often than only once. This, however, would have gone beyond the frame of this examination. There was the fear that one single treatment would not lead to any measureable effect. The fact that nevertheless effects could be proved indicates that an osteopathic treatment would be an

efficient measure within the frame of drug withdrawal therapy in order to alleviate withdrawal symptoms of patients and thus could contribute to a successful withdrawal process.

## 11 Discussion

As according to experts there are too few individual options for therapy for opiate addicts in Austria, osteopathy seems to be a useful complementary medicine method to enlarge the range of supply (see chapter 2 – Introduction). Hence patients of the rehab ward “Walkabout” are for the first time in Austria treated osteopathically during their withdrawal process. In connection with the idea of a holistic treatment, I regard the osteopathic treatment of opioid addicted patients as a great chance for extending the range of therapeutic supply concerning a greater individuality in the area of drug addiction therapy - certainly in due consideration of all current methods of treatment.

Withdrawal from opioids can be one of the longest withdrawal processes of all (see chapter 8 – Withdrawal). But generally it is a fact that the shorter the period of addiction is, the shorter, if not necessarily easier, the process of withdrawal is. The easier the process of withdrawal is experienced, by means of best possible support also on a physical level by the use of osteopathy, the bigger are the chances for subsequent abstinence. The willingness of the addicted person to get into withdrawal again after a relapse, is probably much higher if the remembrance of the precedent attempt is not that painful.

As the methadone dose is tapered daily, withdrawal symptoms constantly change. Most patients do not suffer at the beginning of the withdrawal but at that point in the withdrawal process when the methadone dose is around 15mg and less.

This is observed and confirmed by the majority of opioid addicted patients who have already experienced withdrawal. Although every single patient got a different dose of methadone on the day of the osteopathic treatment in the test group and on the first day of measurement in the control group as on the second day of measurement, it seems as if the effect of the treatment is not severely impaired by that. Despite the difference in methadone dose there is a significant improvement of the patients’ state in the test group.

Every functional improvement initiated by the osteopathic treatment needs time, which the body uses to apply its self-healing forces curatively. Therefore the body often needs, according to the osteopathic idea, several weeks or even months, depending on the treatment technique, which questions the judgment concerning the improvement of symptoms in my study because the checkup happened already three to four days after the treatment. Despite



this time limit a clear improvement of typical withdrawal symptoms could be observed – straight after the treatment as well as a few days later.

Given the limited willingness to cooperate on part of drug addicts, the individual osteopathic treatment and the osteopathic treatment concept are though out concerning feasibility. Thus “Walkabout“ is chosen as the place of treatment, as patients are admitted as inpatients there because keeping appointments is often very difficult for persons suffering from addictions.

According to Seidenberg (1998) their lack of compliance impairs the treatment of opioid addicted persons. Research most often concentrates on a collective of patients with rather high motivation and good compliance, as it is the case here as well. Statements about therapy success most often tend to refer to a group of patients which seems especially promising, regardless of the therapeutic measures applied.

At “Walkabout”, too, patients contemplable for the osteopathic treatment are prechosen and preinformed in the first place by doctors. Thus a rather positive therapy success is to be expected, as patients contribute to the osteopathic treatment by means of positive thinking and motivation. This is why this work does not focus on proving the effect of osteopathic treatment neither on the total magnitude nor on the majority of drug addicts.

The recently used main drug, in this study opioid, influences the process of withdrawal as well as the use of different patterns of treatment. Thus for this study patients were also asked about their consumption of alcohol, cannabis, amphetamines and ecstasy, cocaine and benzodiazepines during the last year before withdrawal. These questions are of importance, as the polytoxicomane abuse of drugs makes withdrawal for patients even harder (see chapter 8 – Withdrawal). However, in the evaluation polytoxicomane abuse was not regarded, as only patients, whose main drug was opioid, were admitted to the osteopathic treatment.

A further point is the way the osteopathic treatment itself is applied. Osteopathic treatment of drug addicts clearly differs from a treatment with drugs. For one thing because the aspect of relationship always matters in the osteopathic treatment, as during the treatment there is very intimate contact which is due to the physical nearness between patient and therapist. And for another thing also because of several other factors which play an important role: the therapist’s attitude towards his patient, his momentary inner attitude, his own momentary condition - which is similar to the situation in psychotherapy (Fischer, 2002; Raben, 1999).

Furthermore placebo effect is an important factor in osteopathy. Van Assche (1997) writes, that „ *80 – 90 Prozent einer gelungenen osteopathischen Behandlung durch die positive Interaktion zwischen Therapeut und Patienten zustande kommt*“.

[80-90 percent of successful osteopathic treatment is achieved by means of positive interaction between therapist and patient.]

The spectrum of osteopathic treatment was limited, because only one single osteopath, in this study the author herself, conducted the treatments at „Walkabout“. But because this study at hand is the first and only of its kind in Austria so far, I would suggest probably considering this point in case of further work of osteopaths with drug addicts.

The examination reveals a statistically significant effect of the osteopathic treatment. In accordance with the hypothesis constructed beforehand, the test group shows a decrease of withdrawal symptoms whereas the control group does not.

For a further study I would suggest a long term comparison of one drug withdrawal institute or a psychiatric clinic which has, besides other elements of treatment, included osteopathy into its withdrawal treatment with others who have not. What would be interesting then as well would be a comparison with the target of completed withdrawal, i.e. how successful the clinical outcome is as well as a comparison concerning the judgment of the patients‘ overall state of condition during withdrawal with the aid of the OWS.

In a subsequent examination the experimental design could be altered concerning the number of treatments, which means that patients receive more than only one treatment. If the tendency of the study at hand was verified, an even stronger effect of the treatment should be observable in such a case. But an improvement of the experimental design would also proceed from the same initial values of the pretest.

## 12 Summary

Obviously in Austria there is a need for a bigger range of individual therapy concerning drug therapy, as, according to experts, currently there is too little supply (Zeder, 2006; Zäuner, 2006; Uchtenhagen, 2006). Osteopathy seems to be an appropriate complementary medical method of treatment that could fill that gap. The importance of osteopathy in this field seems to consist in the fact that in general substance addiction (in this case opiates) is very often exclusively treated again with substances (medication and/or substitution), as it is in the drug substitution program.

Especially drug addicts should sooner or later break with this addiction pattern, in order to find a way out of addiction. Applied besides “classical“ methods osteopathy should increase the well-being and health of patients during withdrawal and thus should contribute to a faster reduction of the substance and, in the long run, to abstinence.

Basically the point of this study is that people learn to feel themselves again, that they regain body consciousness during and after acute withdrawal, which can be alleviated by the administering of substitutes, which is methadone in the case of the rehab ward “Walkabout”. Amongst other things osteopathic treatment can lead to a feeling of improved physical and mental well-being and health.

Apart from acupuncture there is no other field-tested and broadly accepted complementary medical measure in order to support withdrawal-, detoxication and regeneration phase, which makes the attempt of offering osteopathic treatment as additional possible method of treatment seem useful.

In order to present the relevance of this paper for society and osteopathy, chapter 2 lists facts from drug monitoring, which consist of prevalence estimation and data from the field of drug therapy, as well as dates and facts concerning drug consumption in Austria and Europe.

In chapter 4 and 5 the terms opiates and opioids are described and their effects and side effects on the human body are explained.

Besides explanatory models from psychotherapy it is also attempted to explain the effects of opiates on the human body by means of neurobiological and chemical processes. Addiction behavior is not only caused by biological processes in the body, but also by personality traits and the social environment which affect addictive behavior or can lead to substance addiction, respectively. The World Health Organization (WHO) has established a worldwide valid classification and definition of dependence and addiction.

Because this paper deals with the treatment of addicted patients during withdrawal, different methods of withdrawal treatment are presented and discussed because there are various ways out of opiate addiction. The last main drug used before withdrawal influences the withdrawal process as well as the use of the treatment pattern (Höld, 2003).

Subsequently treatment patterns for osteopathic withdrawal treatment and thought models from osteopathy are described. During the osteopathic treatments carried out for this study the body should be treated and supported best possible according to the osteopathic basic principles established by its founder Dr. Andrew T. Still. Therefore many different osteopathic techniques for the alleviation of individual and current symptoms were applied. The study reveals a significant effect of the osteopathic treatment. In correspondence with the hypothesis that was stated before, contrary to the control group in the test group an alleviation of withdrawal symptoms becomes evident. The fact that this effect could be proofed indicates that the osteopathic treatment is an efficient measure to appease withdrawal symptoms of patients in the framework of withdrawal therapy.

Results suggest that in future it would be useful to offer osteopathic treatment in connection with withdrawal in order to improve the patients' health and later abstinence.

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## **14 Appendix**

### **14.1 Verzeichnis der Abbildungen**

Abb. 1: Das „neurochemische Mobile“ als Schema für die Dynamik der wichtigsten gekoppelten neurochemischen Transmissionssysteme im Gehirn – das Mobile bewegt sich u.a. im 24-Stunden-Rhythmus (nach Tretter)

Abb. 2: Die typische Haltung eines Opiatabhängigen

Abb. 3: Veränderung der Entzugssymptomatik

Abb. 4: Ergebnistabelle der zweifaktoriellen Varianzanalyse mit Messwiederholung

### **14.2 Auswertung und Messergebnisse**

#### **14.2.1 Die Auswertung:**

Varianzanalysen dienen der Überprüfung von Mittelwertsunterschieden. Dazu wird die Varianz der Daten analysiert. Voraussetzungen der Varianzanalyse sind eine Normalverteilung in den Gruppen (d.h. die Fehler müssen normalverteilt sein), eine Varianzhomogenität (die Fehler müssen in den verschiedenen Gruppen die gleiche Varianz haben) und die Stichproben müssen unabhängig sein (bei randomisierten Stichproben erfüllt). Weiters muss unter allen Kombinationen von Faktorstufen die abhängige Variable normalverteilt sein mit gleicher Varianz.

Als Varianzanalyse bezeichnet man eine große Gruppe datenanalytischer und mustererkennender statistischer Verfahren, die zahlreiche unterschiedliche Anwendungen zulassen. Ihnen gemeinsam ist, dass sie Varianzen und Prüfgrößen berechnen, um Aufschlüsse über die hinter den Daten steckenden Gesetzmäßigkeiten zu erlangen. Die Varianz einer oder mehrerer Zielvariable(n) wird dabei durch den Einfluss einer oder mehrerer Einflussvariablen (Faktoren) erklärt.

#### **14.2.2 Messergebnisse komplett zur eventuellen Überprüfung**

## 14.3 Fragebögen:

### 14.3.1 Fragebogen Seite 1:

## Drogenwirkungen und entzugsspezifische Fragen

Datum:

stationär seit:

Name:

Alter:

Verordnete Medikamente (siehe Pflege):

### Erstgespräch:

Konsum	keiner	leichter zeitweise	mittlerer regelm	starker ständig
<i>(im letzten Jahr vor diesem Entzug)</i>				
Alkohol:	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Cannabis:	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Amphetamine, Extasy:	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Kokain	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Benzodiazepine	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Anzahl Entzüge bisher:

Angegebene Rückfälle mit illegalen Opioiden:

Dauer der Abhängigkeit (in Jahren)

Schwere Erkrankungen mit organischer Manifestation:

### 14.3.2 Fragebogen Seite 2:

## **Symptome:**

	<i>Keine</i>	<i>Leichte</i>	<i>Mittelm</i>	<i>Schwere</i>
Krankheitsgefühl	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Magenkrämpfe/Bauchkrämpfe	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Muskelzucken/-krämpfe	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Kältegefühl	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Herzklopfen	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Muskelverspannungen	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Schmerzen	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Gähnen	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Tränende Augen	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Einschlafstörungen	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Durchschlafstörungen	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Erbrechen, Übelkeit	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Fieber	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Nasenlaufen, Niesen	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Nervosität, Unruhe, Kribbeligsein	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Aggressionen/Angst	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Depressionen	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Libido- und Potenzminderung	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Schweißausbrüche ohne Kältegefühl u Fieber	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Appetitlosigkeit (mit oder ohne Übelkeit)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Heißhunger	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Verstopfung und plötzlich wässrige Stühle	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Verstopfung ohne Wechsel mit Durchfällen	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Durchfälle ohne Wechsel mit Verstopfungen	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Paranoia	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Engegefühle u/o Atemnot u/o Brustkorbschmerzen:	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Juckreiz	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>