

Psychologic factors in the etiology of amalgam illness

Noomi Elander Lindberg, Erik Lindberg and Gerry Larsson

National Institute for Psychosocial Factors and Health, Stockholm, Sweden

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Eleven patients with amalgam illness aged 33–50 years were investigated by psychodynamic methods. Six of them, all women, were dental nurses and hygienists exposed to amalgam/mercury both from their own dental fillings and occupationally. Four men and one woman were exposed only to amalgam/mercury from their own fillings. Assays of mercury in urine samples and in the ambient air during work routines involving the heaviest exposure indicated that the exposure was far below the levels at which even subclinical symptoms could be indicated by psychometric tests. The psychologic investigation indicated that the symptoms of amalgam illness were psychosomatic. All patients had experienced important psychic traumata in close connection with the first appearance of symptoms. It can be concluded from the psychodynamic dialogues that they had not been able to mourn for a loss in an adequate manner and that the body had been forced to symbolize the great pain in their souls. □ *Dental amalgam; mercury; psychosomatic disorders; psychotherapy*

Noomi Elander Lindberg, National Institute for Psychosocial Factors and Health, Box 230, S-171 77 Stockholm, Sweden

There are periodic alarms in the mass media concerning the danger of amalgam (mercury). Probably, less than one person in a thousand exposed to amalgam in their own dental fillings or occupationally in the dental care service develops systemic so-called poisoning symptoms referred to as 'amalgam illness'. The symptoms are localized in a large number of organs. They are considered to be difficult to explain on the basis of the actual exposure, which has been found to be very low (1–3).

Two epidemiologic studies (4, 5) of the relationship between symptoms that are common in amalgam illness and the total number of amalgam surfaces in repaired teeth have shown that individuals who had many amalgam surfaces did not report more symptoms than those who had few amalgam surfaces. However, the authors did not claim to have refuted a positive relationship between amalgam and symptoms. They assumed that those who have amalgam illness may consist of a very small number of sensitive individuals who are submerged in epidemiologic studies.

Jontell et al. (6) conducted an inves-

tigation to 'elucidate possible aetiological factors' underlying the complaints reported by 62 patients referred because of presumed oral galvanism and amalgam illness. Twenty-nine patients, matched with a subsample of the test group for age and sex, constituted a control group.

The patients were examined with regard to oral medical and stomatognathic health. Their psychologic and social health and symptoms were evaluated by means of a standardized interview and five self-rating questionnaires.

Complex symptoms and signs, including symptoms arising from both the oral region and other parts of the body, constituted the most distinctive feature of the patients in the test group. The clinical examination and the patient-perceived symptoms showed high prevalences of parafunction and dysfunction in the muscles of the stomatognathic system. Furthermore, general complaints were mainly related to muscles of the extremities, and diseases of the joints and muscles were the most frequently reported disorders. The findings of the oral medical examination showed no differences between the groups

except signs of parafunction. Patients in the test group showed evidence of being more heavily exposed to negative social events, and the results clearly indicated a psychogenic component underlying the reported complaints. The mean value for negative social events was significantly higher in the test group than in the control group ($P < 0.01$).

Similar results were obtained by Ekholm et al. (7) when they studied 15 persons who had sought treatment for oral galvanism/amalgam illness. They report (p. 3): 'To avoid unnecessary procedures, psychiatric examination is recommended when planning further treatments for such people.'

Hampf & Ekholm (8) studied another group of 38 patients with presumed oral galvanism. All the patients filled in the Cornell Medical Index health questionnaire, and 20 (randomly chosen) patients were referred for a psychiatric interview. A significant difference in mental health was found between the patients and a control group. The patients with oral galvanism frequently had different kinds of depression and showed a significantly higher prevalence of reported somatic symptoms of the kind into which such subjects may attempt to channel inner conflicts. In general, they had no desire for psychiatric therapy but hoped to find a somatic reason for their symptoms.

The diagnosis 'amalgam illness' usually refers to symptoms caused by one's own fillings. The subjects included in this study are, on the one hand, dental nurses and dental hygienists who consider themselves to be occupationally poisoned and, on the other, individuals exposed only to their own amalgam fillings that one of the authors (N. E. Lindberg) encountered in her psychotherapeutic work. All of them implicate amalgam as the reason, or explanation, for their illness. The symptoms are virtually identical in the two groups.

Aim

The aim of the study was to elucidate the significance of psychogenic factors in the syndrome of amalgam illness.

Materials and methods

Materials

The study includes six dental nurses and hygienists, all of them women aged 33–46 years ($M = 39$; $Md = 39$), who had reported an occupational disease to the local Social Insurance Office (group 1). Of a total of seven persons reporting such diseases, these six were willing to participate. Also included in the study are four men and one woman (aged 33–50 years; $M = 4$; $Md = 41$) encountered by N. E. Lindberg in her psychotherapeutic work. Three of these five, referred to here as amalgam carriers (group 2), were referred by psychiatrists, one by the Social Insurance Office, and one by the County Employment Board.

Amalgam fillings were being replaced with other materials in five of the six women in group 1. Four of the five subjects in group 2 had already had their amalgam fillings replaced, and the fifth had commenced replacements at the rate of one filling a month. He reported that the symptoms of amalgam illness were worsened for several days in connection with each replacement. All of the subjects had received their first amalgam fillings through the School Dental Care Service.

Methods

All the subjects gave a detailed history of their symptoms. In addition, the dental nurses and hygienists (group 1) gave exposure histories and, in certain cases, submitted urine samples for mercury assays for a few days before and after each amalgam replacement, as the exposure was assumed to increase when old fillings were drilled. In group 2, urinary mercury assays could be performed in only one male subject whose psychotherapy was in progress at the time that group 1 was being investigated. Before psychotherapy, another male subject had had mercury assays performed on blood, urine, and hair (all showing normal values).

Assessment of exposure

To assess the worst possible working environment of the most heavily exposed

subjects—two dental hygienists who dry-polished old amalgam fillings without exhaust facilities—the concentration of mercury in the air of the subjects' breathing zone was measured during the course of 2 working days comprising only such work.

Earlier published measurements of exposure levels for dental care personnel referred to in Ref. 3 were studied to assess the exposures retrospectively.

Psychogenic factors

In group 1, individual in-depth interviews were conducted on the basis of psychoanalytic theory in three 90-min sessions, with one equally long follow-up dialogue in which the occupational injury claimants were informed of the contents of the report and were given the opportunity to respond to the results of the in-depth interviews.

The therapy in group 2 was more in the nature of psychotherapeutic dialogues lasting 60 or 90 min, and insight therapy was possible in two cases. The number of dialogues in the five cases was 4, 5, 7, 19, and 50, respectively. The three patients participating in a small number of dialogues dropped out because they were unable to benefit from the therapy. Two of them were psychotic, and one appears to have quit because he simply wanted to be afflicted.

Results

Exposure

The assays of mercury both in the urine samples and in the air in the breathing zone and also previously published assays showed that the levels of exposure were far below those at which even a subclinical effect could be demonstrated by psychometric tests. This also applies to urine samples taken in connection with drilling in old amalgam (3).

The total period of occupational exposure ranged between 11 and 21 years in group 1. When the study started, all subjects had been free from exposure—for instances absent from work owing to certified illness, to take care of a child, or for job retraining or occupational rehabilitation—for a period of 5

Table 1. The number of subjects in group 1 ($n = 6$) and group 2 ($n = 5$) who reported symptoms considered by the Association of Patients Damaged by Dental Treatment to be signs of mercury poisoning in amalgam illness

	Group 1	Group 2
Pain in muscles and joints	5	1
Tiredness	6	4
Vertigo	6	3
Headache	6	5
Gastrointestinal disorders	3	3
Sensation of dryness of the eyes	2	2
Other eye ailments		
Smarting/ulceration in mouth	1	
Heart trouble	6	3
Circ. disorders/cold hands/feet		
Loss of memory	4	2
Difficulty in breathing	6	5
Ear trouble ('stopped up')		2
Depression	6	4
Difficulty in concentrating	4	3
Eczema, rash, itching	1	1
Throat trouble		
Restlessness, nervousity, anxiety	6	4
Trembling, twitches, cramps	2	3
Nausea, vomiting	5	2
Prickling/creeping sens., tension	2	3
Digital tremor	4	
Heat sensation		
Sinusitis	2	
Loss of hair		1

months to 3 years, the median being 1 year.

In group 2, three subjects had been sick-listed for 5 years, 2 years, and 1 year, respectively, for symptoms they attributed to amalgam illness. The other two were working full-time. The latter are the ones who continued the psychotherapy.

The relevance of the exposures to the symptoms will be treated in the Discussion.

Attitude towards psychotherapeutic consultation

In reply to an inquiry as to whether they were willing to take part in the study, the subjects in group 1 gave answers ranging from 'Yes, I will; I'm very grateful' to 'I will if the others do'. In group 2 the attitude was somewhat more positive; they had in fact played an active part themselves in getting a referral to the psychotherapist (N. E. Lind-

Table 2. The number of subjects in group 1 ($n = 6$) and group 2 ($n = 5$) with symptoms that they themselves claimed were caused by mercury

	Group 1	Group 2
Increased need for sleep	4	2
Miscarriage	1	
Aggressiveness	2	5
Sensitivity to infection	2	2
Facial pain	1	
Tension in face/jaw	1	1
Gastritis	3	1
Hypersensitive to smells		1
Pain in renal region	6	

berg). One of them had already taken a fairly long course of psychotherapy earlier. A characteristic common to both groups was that they more or less demanded that the therapist state whether she 'believed in mercury poisoning'. They all received the same answer: she believed them when they described how they felt and had felt physically and emotionally, but she did not know whether the condition was caused by mercury.

The manner in which appointments with the therapist were handled varied. Three subjects in group 1 came in for all interviews and dialogues. The other three replaced one or two interviews or dialogues with one or two telephone calls of up to 90 min. Four of five subjects in group 2 kept all therapy appointments. Only one did not come in or came in much too late for all appointments. He stated that he had overslept, even on the occasions when he saw the therapist in the middle of the day. He had been sick-listed for 1 year.

Medical history

The symptoms were largely the same in both groups, except that the dental nurses and hygienists (group 1) reported aches and pains in most joints and muscles; this was not as marked in group 2. Eight of the 11 subjects reported that they were, or had been, depressed. On an average, 12 of the 25 symptoms regarded by the Association of Patients Damaged by Dental Treatment and

reported in 1987 by the Swedish National Board of Health and Welfare as signs of mercury poisoning or amalgam illness (9) were exhibited (Table 1).

Other symptoms that the patients themselves considered to be due to mercury or amalgam poisoning are listed in Table 2. On an average, 3 of these 10 symptoms occurred in each subject. The therapist got the impression that the patients often found it difficult to specify whether they had had a certain symptom or whether this was a sign of depression. Not infrequently, their answer was 'perhaps', 'at certain times', etc. The frequencies given in Table 2, however, refer to symptoms the patients were sure about.

Most of the symptoms occurred more or less continuously. Others were more episodic, such as, palpitations, shortness of breath, trembling, cramps, and sweating. When the therapist met these patients, the symptoms had existed for several years (3–15 years) and had gradually subsided somewhat.

Symptoms that, according to Kringlen (10), occur in acute and chronic anxiety were prominent. On an average, 19 of 32 such symptoms occurred (Table 3) and, on an average, 10 of the 17 symptoms that, according to the same source, occur in depression were reported (Table 4). Sexual problems, sometimes involving the patient's own sexual identity, were also noticeable in the dialogues—for example, 'I function better sexually than other women', 'I have no feeling in the glans of my penis', and 'I have no sexual feelings'.

All 11 patients satisfy the criteria of the American Psychiatric Association (DSM III R) for both anxiety neurosis and depression. Three of the six subjects in group 1 had contacted the county psychiatric service because of poor mental health. There they were informed that 'nothing psychic' was involved. One was diagnosed as having endogenous depression, however, and was treated with psychotropic drugs. A fourth had been examined at the psychiatric service, where she completed a questionnaire 'which said that I was preoccupied with myself and that everything revolved around me and that I was entirely preoccupied with checking to

Table 3. The number of subjects in group 1 ($n = 6$) and group 2 ($n = 5$) who reported symptoms that occur in acute and chronic anxiety

	Group 1	Group 2
Vertigo	6	3
Anxiety	5	3
Inner restlessness	6	4
Fear of death	3	2
Extremely strong, rapid pulse	5	3
Palpitations	6	3
Pain or pressure over chest/heart	3	2
Nausea	5	2
Heavy breathing	2	2
Dyspnea/shortness of breath	6	4
Feeling of suffocation	3	4
Sweating	5	1
Faintness	4	4
Fainting	1	
Wide pupils	5	3
Ruddy complexion	1	3
Numbness, creeping sensation	3	2
Headache/migraine	6	5
Cramps, muscular twitching	5	3
Urinary urgency	1	2
Diarrhea	4	1
Impaired power of observation	3	1
Difficult in concentration	4	3
Irritability	2	5
Depression	6	4
Dejection	6	3
Anxiety-ridden dreams/nightmares	1	2
Loss of sensation, fingertips	3	3
Loss of sensation, around mouth	2	1
Loss of sensation, in toes	1	2
Insomnia	5	3
Fears, phobias	3	3

Table 4. The number of subjects in group 1 ($n = 6$) and group 2 ($n = 5$) who reported symptoms that occur in depression

	Group 1	Group 2
Looks on the dark side of things	5	4
Apathetic robot	3	3
Life hard and meaningless	4	4
Apt to quarrel	3	2
Runs out of tears	2	2
Lump in throat	1	3
Poor appetite		1
Eats for consolation	2	2
Sexually disinterested	3	3
Dryness of mouth	4	2
Tiredness out of proportion to work done	6	4
Insomnia	4	2
Headache	6	5
Slight nausea	5	4
Hard to find strength to work	5	4
Difficulty in concentrating	5	3
Memory beginning to fail	4	2

Table 5. Diagnoses from a psychologic perspective in group 1 ($n = 6$) and group 2 ($n = 5$)

	Group 1	Group 2
Reactive depression	2	2
Borderline, hysteria of the body*	3	1
Paranoid psychosis	1	2

* According to McDougall (16); see Discussion.

see how I felt'. Three of the five in group 2 had been in contact with a psychiatrist for several years. One had been in psychotherapy for many years.

On the basis of the psychotherapeutic dialogues, 8 of the 11 were unable to verbalize experienced mental discomfort and/or strong emotions. When asked by the therapist how they had experienced their psychic trauma, they would answer 'I didn't feel anything', 'It was worst for Mother', 'Nobody said anything, but I felt that they blamed me', etc. The responses did not apply to their own feelings. We concluded that to express their feelings in some manner, these individuals made use of somatic symptoms instead.

The diagnoses arrived at after the in-depth

interviews and therapeutic dialogues were reactive depression in four cases, borderline 'hysteria of the body' in four cases, and paranoid psychosis in three cases (Table 5).

According to the therapist (N. E. Lindberg), three subjects in group 1 would be able to benefit from psychosomatically oriented psychotherapy based on psychoanalytic theory. Two in group 2 subsequently received this type of therapy and benefited considerably from it. The remaining subjects were not available for psychotherapy at the time.

In all cases, the amalgam illness symptoms first presented in connection with psychic trauma. The somatic medical history and the related life events clearly showed how

Table 6. Psychic traumata that triggered or aggravated symptoms in group 1 ($n = 6$) and group 2 ($n = 5$)

	No. of cases in	
	Group 1	Group 2
Death of parent	4	2
Death of other close relative	1	
Spontaneous abortion (three times)	1	
Divorce	3	
Termination of amorous relationship	2	3
Marriage	3	1
Childbirth	3	1
Adoption (twice)	1	
Grown child leaves home	2	
Parental infidelity		1
Parental abusiveness		1
Gang-bullied		1
Repeated changes of residence/separations		1

the symptoms evolved and became more severe in connection with each psychic trauma. Thus, several subjects had been afflicted with severe or crucial life events of the separation type. The commonest trauma in connection with the onset or impairment of symptoms was that a father had died; 6 of the 11 patients had experienced this. The next commonest were divorce, marriage, childbirth, adoption, a grown child moving out, becoming a stepparent, repeated spontaneous abortions, disappointments from parents or mate (Table 6).

Eight of the subjects had made the amalgam poisoning diagnosis themselves, and in three cases the diagnosis was made by a psychiatric service.

Life events unusually frequent in the group?

Theorell et al. (11) have studied life events in a normal Stockholm population. For several reasons, a comparison with our group must not be taken too far, however. The life events in the studied normal population apply to a period of 3 years, whereas those in our group are distributed over at least a 10-year period. For this reason, a larger number of individuals in our group can be

Table 7. Number of individuals affected by life events in the groups

	Amalgam illness (period of >10 years)	Normal population (period of 3 years)*
Separation/divorce	6/11 (0.55)	15/182 (0.08)
Death of close relative	6/11 (0.55)	52/184 (0.28)

* The difference between men and women was so small that they are reported jointly.

expected to have been affected by critical life events, although not strictly in proportion to the actual period of time. For example, there is a limit to how many times parents can die, and repeated divorces are much more unusual than single ones. The age distribution is much wider in the normal group studied by Theorell et al., although the average age seems to be rather similar in the two groups (the median age in the amalgam illness group was 40 years; for the normal group it is reported only that it was within the range of 35–44 years). Furthermore, only those life events that have triggered or aggravated the symptoms are accounted for in the amalgam syndrome patients. Finally, life events have not been defined in an entirely identical manner in the two studies. Two types of life events are described so similarly, however, that a comparison is deemed reasonable (Table 7).

A larger proportion of subjects appear to have been affected by separation/divorce in the amalgam illness group than in the normal population. A smaller difference between the groups is indicated with regard to death of a close relative (see comment above).

To sum up, all of our patients with amalgam illness have had important psychic traumata in close connection with the onset of symptoms. They have not been able to mourn for a loss adequately, and the body has had to symbolize the great pain they have felt in their souls. They have all had an early psychologic disturbance, which is apparent from the psychologic defences they employ—for example, denial, projection, dislocation, aggression, and somatization.

Most of them find it difficult to express in words what they feel, and react instead with somatic symptoms to the mental stress that they experience. The illness they then develop is the one 'offered' to them. In these cases it became amalgam illness.

The two patients who completed the psychotherapy noted improvements in their emotional stability and day-to-day functional ability. They acquired more self-esteem and were therefore able to act more independently.

Discussion

In this case material we found no difference in symptoms between the subjects who had been exposed only to their own amalgam and those who had also been exposed occupationally. Nor were there any differences in the mercury concentrations in the urine, which were far below those at which it has been possible to demonstrate even sub-clinical effects. Since most of the individuals investigated had been exposed both occupationally and via their amalgam fillings—and several urine analyses were made in connection with drilling in old fillings—we consider it probable that the exposure to mercury and the concentrations of mercury in the urine were not, at any rate, lower in the patients examined than in patients with amalgam illness in general.

If, in spite of the low-level exposure, the symptoms have a physical connection with mercury concentrations, it must be due to some kind of hypersensitivity. The most probable explanation, then, is that the immune system is involved. The commonest symptom, both in the patients investigated here and in the survey conducted by the Association of Patients Damaged by Dental Treatment, is pain in joints, tendons, and muscles. It is difficult to find any other explanation for this pain or inflammation than an immunologic relationship. Autoimmune reactions can be induced by mercury (12). Furthermore, we know that the risk of the appearance or aggravation of immunologic diseases increases in connection with mental stress (13). This is still more prominent in

'fibrositis'—that is, tenderness and pain in tendons and muscles and non-progressive inflammation in joints (14).

It is precisely this type of joint and connective tissue disorder that has occurred in the patients studied. Therefore, the immunologic hypothesis and that of mental stress are not contradictory but rather cooperate.

Grittiness and dryness of the eyes, reported by four patients, may also be a rheumatologic/immunologic manifestation that occurs in women in particular (cf. Sjögren's syndrome).

Separation problems

The psychologic investigation yielded clear support for the possibility that all the subjects had reacted psychosomatically to experienced psychic traumata. All of the symptoms seen in deep depression and acute and chronic anxiety appeared in the subjects. Separation anxiety had also been a frequent problem. In six cases the death of a father had occurred in close connection with the onset of symptoms. One of these six patients had also had repeated miscarriages. Three of the six had also had divorces, and one of the six had moved in with a new mate and his children. In two others the symptoms presented in close connection with the point in time when the oldest child left home.

The triggering factor in a depression is usually the loss of an 'object'. One loses something valuable, such as a person, the love of a person, or a job. This results in narcissistic frustration. Then the aggressive impulses contained within the individual may be triggered. The aggression cannot always be directed against the object, however, but is turned inward instead against one's own person. The individual both mourns his loss and punishes himself at the same time (15).

Even an apparently happy event can trigger a depression because the event itself is associated with increased responsibility, greater demands, and less opportunity for regressive behavior (15).

In the study by Jontell et al. (6) separation problems are also prominent in amalgam illness—for example, the loss of a child, a

young relative, or an elderly relative; or serious injury to one's child; being tired of life, or having a destructive lifestyle.

The diagnosis 'hysteria of the body' has been described by McDougall (16). The illness and symptoms are the expression of an unconscious psychic conflict. The somatic symptom is a first attempt to express the conflict. The patients try to 'think' with their bodies. Borderline personality problems may be involved here. The phenomenon may also be referable to an overwhelming event in early childhood involving fright or sorrow. It may have been repressed but pops up again in a new crisis that reminds the subject of the old original mental crisis. It was not sorted out on the first occasion and not on the second either but is expressed by a physical symptom.

McDougall (17) uses the term 'archaic hysteria' with reference to psychosomatic phenomena. She thinks it is more a matter of protecting the right to exist. This is aroused when the feeling of personal identity or life itself is threatened with extinction.

Individuals who, for some reason or other, have been thwarted in their attempts as infants to gradually arrive at an inner representation of a calming and caring maternal environment, and identify with this 'internal mother', have a strong need throughout their lives for an internal protecting figure.

We wonder whether this may be the background behind the fact that the death of a father is such a prominent life event at the onset of the illness. Has he embodied the protection that the mother could not provide? It should be noted that even one's own child can substitute as an internal mother (18).

All of the subjects in this study were in very poor mental health. Furthermore, they encountered no understanding by others, and, to judge from the interviews, they were indeed unable to show this in any other way than through somatic symptoms. Our experiences are in line with those reported by Ekholm *et al.* (7). The fact that the patients found it difficult to discriminate between different symptoms is in conformity with the findings of Watson & Pennebaker (19) and Costa & McCray (20). Depressed patients

report more symptoms than non-depressed patients. Costa & McCray (20) are of the opinion that psychosomatic investigators should routinely note the degree of neuroticism in their patients and take this into consideration when reporting symptoms. Watson & Pennebaker (19) say that patients with high negative affectivity tend to be over-diagnosed owing to their tendency to complain of many physical symptoms.

Our patients were influenced by reporting in the mass media about amalgam illness. When the patients were asked how the diagnosis amalgam poisoning was arrived at, the immediate answer was, 'I read about the symptoms in the newspaper and heard about them on the radio and TV'. Three of the patients were diagnosed as having mercury poisoning in the hospital. They were in poor mental health, but they found no understanding for this in the psychiatric unit and were told that their symptoms 'were not mental but the amalgam'. This contributed to fixing the patient in his or her illness behavior.

All of the patients were manipulative, and acting out of aggressive feelings occurred frequently in the dialogues. On a theoretical level, this indicates that manipulation is a common psychologic defense in this group of patients.

An interesting observation we made was that in two patients, the somatic symptoms subsided at the same time as they began to feel depressed. We regard this as the patient changing over from expressing mental pain with physical symptoms to expressing them psychically, which can be interpreted as a sign of recovery. Most of them found it difficult to express in words what they felt, and all of them had somatic symptoms. The fact that some felt better as the amount of amalgam removed from their mouth increased may have had to do with conditioning and expectation. However, in the group not exposed occupationally, most of the symptoms persisted even though most of them had been free from amalgam for several years.

The fact that the symptoms subside with the passage of time has to do with the normal pattern of a crisis reaction after a traumatic life event (21).

The intensity of the aggressive feelings of these patients was manifest. The therapist perceived them as a form of primitive oral aggressivity with destructiveness or self-punishment (cf. archaic hysteria above) as its purpose. The therapist wondered what forces were behind this behavior. Some possible answers are discernible. Problems involving the patients' own sexual identity were prominent in many different ways and took up much time in the psychotherapeutic dialogues. The death of a father was the most common psychic trauma, followed by a broken-off amorous relationship or separation/divorce, but marriage and child-birth have also entailed psychic traumata for these patients.

The authors are struck by the great inclination and ability of this group of patients to present their story in the mass media and to those in power. They can make a strong impression and act with great enthusiasm to achieve their goal. There are hysterical elements in their approach. We agree with the view expressed by Irene Matthis (Unpublished observations), psychiatrist and psychoanalyst, in a lecture on hysteria. She thinks that hysteria still exists. As a mystery: 'Hysteria behaves like a guerrilla army which, in the face of superior forces, retreats temporarily and disappears amongst the peasants, moving like a fish in water. But as time revolves, it pops up again, resurrected, to disrupt the clockwork of science. It recurs constantly in new shapes and forms. Today we encounter hysteria in all the forms of psychosomatosis. It is the ailments of modern times: allergies, gastrointestinal problems, skin diseases, migraine, vertigo, joint and muscle disorders . . . [and, we would add, amalgam illness]. Today, the overwhelming catalogue of possible manifestations in the field of psychosomatosis once again includes hysteria in its wild, untamed state. The suffering in all these different forms is, however, an expression of old torments. The body has not evaded hysteria.' So far Dr. Matthis.

Why do the amalgam illness symptoms not break out in connection with the first adverse life event? This may have to do with the fact that most people have a certain ability to

cope. It is when the same type of psychic trauma is repeated that the burden finally becomes so heavy that the psychic defences fail and illness develops. The situation is similar in 'classic' psychosomatic disorders. For example, nobody gets an ulcer at the first psychic trauma. Furthermore, the perceived significance of a life event can change with the passage of time (11).

Are the symptoms representative?

The study comprises 11 subjects, 6 of whom were exposed to amalgam both in their own dental fillings and in their occupations. These six had been invited to take part in a planned study. The remaining five had actively sought treatment and had only been exposed to amalgam from their own fillings. Even though the manner of selection differed and the level of exposure probably was higher in the first-mentioned group, the symptom panorama was similar in the two groups. Thus, a presumably higher level of exposure could not be shown to produce symptoms of a more objective toxification and less psychic or psychosomatic nature than at a lower exposure. This suggests that the method of selection did not result in a group with less 'mercury poisoning' and more psychosomatic symptoms than in a group chosen randomly from all subjects with the amalgam syndrome. And this in turn suggests that a psychic or psychosomatic genesis of the symptom complex is important in amalgam illness.

Conclusion

Our conclusion is that the symptoms of the patients with amalgam illness examined by us are psychosomatic. The symptom complex can be explained by the psycho-traumatic background. However, as mercury can influence the immune system, symptoms with an immunologic pathogenesis must be commented on separately. This refers mainly to pain and inflammation in the musculoskeletal system and possibly dryness of the eyes. For both theoretical and clinical reasons, it can be concluded that such symp-

toms always have a psychosomatic component (13). If the symptoms are treated only by a removal of mercury without treating psychogenic factors, a raised immunologic vulnerability to minimal doses of agents other exogenous or endogenous than mercury will remain.

As to other symptoms, theoretical considerations, clinical experience, and the present findings suggest that psychogenic factors are essential in the pathogenesis.

To be able to draw more general conclusions, it is desirable that other investigators should repeat our study. The difficulties encountered in getting the patients to participate in such an investigation should not be underestimated, however. The manipulative ability of the patients is another important factor to which the researcher and/or therapist should pay special attention. Cooperation across different disciplines is needed for a constructive investigation and for the treatment of patients with amalgam problems.

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