Wolfgang Bonte,[1] *M.D.*

Self-Mutilation and Private Accident Insurance

REFERENCE: Bonte, W., **"Self-Mutilation and Private Accident Insurance,"** *Journal of Forensic Sciences*, JFSCA, Vol. 28, No. 1, Jan. 1983, pp. 70-82.

ABSTRACT: During the past few years in the Federal Republic of Germany, there has been a continuous increase in deliberate self-inflicted damage with the aim of defrauding insurance companies. This paper concerns itself with amputations of the finger(s) caused by axes, electric saws, and blunt force. The difficulty of proving an intentional injury is shown, and suggestions for a procedure for making a report are given.

KEYWORDS: pathology and biology, fraud, self-mutilation, private accident insurance

Dedicated to Professor Dr. Berg on the occasion of his sixtieth birthday.

Self-inflicted injuries belong to the vast range of deceptions. Schibler's description of them as the most extreme form of malingering really only touches on certain aspects of the spectrum of motivations [*1*]. The same thing applies to Jungmichel's evaluation, which characterizes suicide as the most effective of self-inflicted injuries [*2*]. The terms "self-inflicted damage," "self-inflicted injury," and "self-mutilation" are usually used synonymously, although they actually have distinct definitions. If one understands "self-mutilation" as the voluntary, substantial loss of peripheral parts of the body, then the expression "self-inflicted injury" includes injuries to the surface of the body, which do not mutilate. Self-inflicted mutilations are irreversible; other self-inflicted injuries are not necessarily so. "Self-inflicted damage" is the term used to cover every kind of deliberate interference with physical soundness and efficiency—including, for example, swallowing objects or artificially creating or sustaining illnesses.

The motives behind such actions are extremely varied; moreover they seem to have undergone a definite change over time, according to the comprehensive literature available. In the course of post-World War II social reconstruction, the improved social situation of the majority of people in industrialized countries has led to a change of outlook in the field of self-inflicted damage as well. Self-inflicted injuries endured for mystical-religious reasons, often seen in earlier times, are as rare these days as are those carried out in the armed forces as a way of avoiding duty on the frontline. Instead, a stronger trend towards the procurement of material advantages can be recognized, involving anything from obtaining sick pay under false pretences to insurance swindles involving private accident insurance. As medicolegal diagnosis improves, the difficulty of concealing artifices obviously becomes greater, and consequently the kaleidoscope of refined deceptive maneuvers becomes more colorful.

When private accident insurance was introduced in England in 1849, in France in 1865,

Received for publication 20 April 1982; accepted for publication 4 May 1982.

[1]Privatdozent, Doctor of Medicine, Institute of Legal Medicine, University of Goettingen, Federal Republic of Germany.

and in Germany in 1871, no one thought at first that people might deliberately injure themselves as a way of obtaining a pension or money for damages. In general, the fear of pain and the uncertainty of the outcome was thought to be too great. Self-inflicted injuries were, in fact, quite rare as a means of obtaining insurance money until the 1920s. The sums contested also remained quite small, on the whole. In one example from this period, a public liability claim was made, as noted by Lochte, in a case in which a bite from a horse was simulated [*3*]. An interesting parallel is provided in a similar case reported by Jungmichel [*2*]. It was only after World War II that so-called "pension hunters" became significant [*4–6*]. More rare, but therefore usually more spectacular, were cases in which accident insurance swindles were proved or could be conjectured. Of these, the Marek case in 1926 was one of the first and most well known. The Vienna legal doctors considered it impossible that the engineer Marek, who was insured for high sums of money with several insurance companies, had had an accident at work; the court, however, could not believe that someone would cut off his own leg with an ax [*7,8*]. Occasionally one comes across stories of people who do not stop at even the most severe mutilations. Lange reports a 1969 case in which a doctor, after applying a local anaesthetic, shattered both his right leg and his left hand [*9*]. Bürkle de la Camp and Gross mention a man who let both of his legs be chopped off by a railway train [*10*]. He was found out because a large quantity of bandages were found on him, which he must have concealed before the supposed accident. As injuries that are undergone voluntarily do not come into the category of accidents for which compensation is awarded, cunning allegations, which are often difficult to disprove, are usually made to hide the fact that the injury was self-inflicted.

Questionable Injuries from Ax Blows

In working life finger amputations often occur when wood is being cut, usually of the thumb and forefinger. Accordingly, the swindler prefers to allege that the accident occured while he was chopping wood [*11*]. The cause of the injury is most often said to be a misplaced stroke of the ax, followed by the ax glancing off the wood. These accidents usually have no witnesses and very often the evidence has been removed right after the supposed accident. As a rule, everything depends completely on the statements of the injured party. During the analysis of the accident, statements are often made explaining how the injured person was holding the piece of wood that was to be chopped. A claimant might say, for instance, that it was held at the side, with the left hand, so that the thumb was placed on the side of the wood nearest to him and the long fingers on the opposite side. Through some coincidence, either by a knock from the handle of the ax or by the ax-head rebounding off the log, the result of a bad stroke was that the thumb or index finger was cut off completely. The severed finger, therefore, was not resting on a solid base.

This kind of statement completely contradicts experimental research. As early as 1938, Nippe could show, by experimenting with corpses, that with the hand in such a position, although it might be wounded, it was impossible for a finger to be totally amputated [*12*]. For this to happen, the finger must be lying on a solid base. For exactly the same reasons, a finger lying on a springy base can be cut but not cut off, as Tanner was able to show [*13*]. In more recent experiments, Schnabelmeier and Mika [*14*] found that even a finger lying on a plank cannot be completely severed, despite the greatest efforts being made, as there is always a certain amount of springiness in the wood (according to Dotzauer the same is true for a cork board [*15,16*]).

We ourselves recently saw a case in which a doctor, who was insured for a high amount, maintained that he had unintentionally struck his index finger when he was trying to chop off a gorse twig. Figure 1 shows the supposed position of his hand at the moment of injury. The doctor had wanted to push the twig down with his left hand onto a branch lying crosswise underneath it. His index finger was laid on top of the stem near the place where the

FIG. 1—*Reconstruction of the position of the hand at the time of the alleged accident.*

gorse twig was touching the branch. His finger was completely amputated when he made the false stroke. As the X-ray shows (Fig. 2), the amputation was just above the knuckle joint of the forefinger. It ran straight across the fingerbone. According to the surgeon who treated him, the skin was also cut straight across in the same way. The edge of the wound was a completely flat circle. In investigating this case, we made exhaustive tests with an ax, and can confirm that it would be impossible for the finger to be completely amputated, owing to the springiness of the underlying material.

Occasionally it is alleged that a finger was lying on the chopping block while a larger piece of wood was being cut. Undoubtedly, people can place their hands in a dangerous position when chopping wood, especially those who have had little practice. In one test, we asked people to chop a large piece of wood using an ax, without telling them what we were looking for. In the photographs of this test (Fig. 3), one can see the typical hand positions. In 200 tests, Position a was observed 72 times, Position b four times, c six times, d forty times, e twice, f six times, g once, and h twice. In the other 67 tests the log was held at the side. Most strokes of the ax fell somewhere near the middle of the wood, as intended (that is, at least 100 mm away from either edge). A total of 124 strokes (62%) fell within 15 mm to the right or left of the spot aimed for. Of the other strokes, 61 fell on the side furthest from the hand holding the wood—the safer side; only 15 strokes fell on the side of the wood held by the hand. Of these, the distance from the desired spot measured between 16 and 25 mm in twelve cases; 26 to 35 mm in two cases; and in only one case, or 0.5% of the total was the difference more than 35 mm—it was 37 mm. Of the 76 false strokes, the hand was indeed laid on the chopping block in a dangerous position in three cases, but it was removed every time before the ax actually fell.

FIG. 2—*X-ray of finger amputation after surgical treatment.*

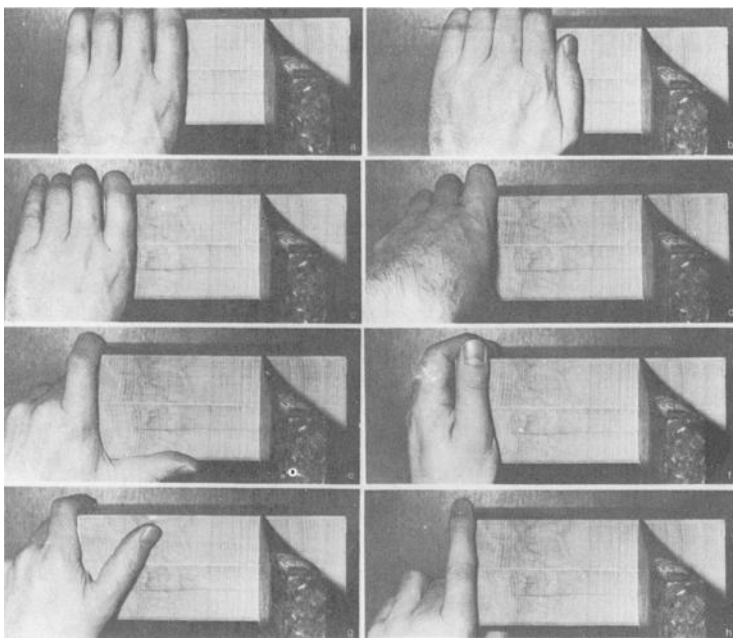

FIG. 3—*Dangerous hand positions during 200 experiments at chopping*: *Position* a *occured 72 times.* b *four times.* c *six times.* d *40 times.* e *twice,* f *six times.* g *once.* h *twice. During the other 67 experiments the log was grasped from the side* [17].

The deviation from the intended direction of the stroke (misjudgement of the angle) was remarkably small. In 51 cases (25.5%), the cut was almost perfect and in 121 cases (60.5%), the deviation was less than 5° in either direction; of these, deviations toward the hand holding the wood were predominant, accounting for 41% of the total trials. Deviations between 5 and 10° occurred in 25 cases (12.5%), and once again those in the direction of the supporting hand were in the majority, with 11.5%. Finally, three deviations lay between 10 and 15° in the direction of the supporting hand (1.5%). No deviations greater than this were observed [*17*]. If one realizes that the middle finger lies in a straight line if placed in a dangerous position on the chopping block, then an unintentional injury to the index finger, for example, cannot be ruled out; however, it is impossible that the cut should be at right angles to the finger bone. On the basis of this research, we were able to convict another doctor of an insurance swindle. He had maintained that while chopping firewood, he had laid his hand on the chopping block in a careless manner. Then, with a misjudged stroke, he had completely amputated his index finger just above above the knuckle—in exactly the same way as in the case mentioned previously. The cut had once again managed to amputate the index finger straight across. The fingers next to it were not injured. Now, it is logical to suppose that the closer an accidental injury occurs to the base of the finger, and the closer the angle between the cut and the finger bone is to a right angle, the more likely it is that the neighboring fingers will be injured. In cases like the two just described, then, one might speak of the "execution" position.

One cannot apply these arguments to the thumb without bringing further considerations to bear, as Bach has already indicated [*18*]. Complete thumb amputations are often described in the literature. For example, Schibler describes five such cases [*1*], and Schnabelmeier and Mika as many as 45 [*14*]. Even in our chopping tests, the thumb was, in three cases, spread out in a grotesquely dangerous position and placed diagonally across or even to the front of the chopping area. Although the cutting stroke fell far from the middle point, on the safe side, in all three cases, the possibility of an unintentional amputation cannot be ruled out. Such an amputation could certainly be straight across the thumb bone, probably nearer to the tip of the thumb than to the end joining it to the hand; in any case, on the basis of the deviations from the desired spot for the ax to fall that were established in our research, an amputation near the knuckle of the thumb should be considered highly improbable. However, even if the hand should be placed in this unusual position, it must not be assumed that the index finger would necessarily be injured at the same time. It is important to note that in all three cases, the thumb, because of its physiological position, was placed on its radial side. If an unintentional injury were to occur, it would be at the side and in no way could it be from the back of the thumb through to the front. In an actual case, one would therefore have to establish which side of the thumb had been hit.

Complete amputation of the hand occurs very rarely. As it is practically impossible for an accidental amputation of the entire hand to occur while someone is cutting wood, the usual causes given are being run over by a train or having an accident while using a paper-cutting machine, a scrap-metal cutter, and the like [*13*]. Dern also mentions a case of indirect self-injury of the hand with an ax [*19*]. The insured was supposed to have been accidentally hit by an acquaintance while they were putting slates on a roof. The man behaved very strangely after the event and kept asking for his injured hand to be amputated. This finally aroused suspicion. We ourselves have also examined a hand that was almost completely amputated by a blow from an ax (Fig. 4). In this case, an insurance salesman claimed he had been attacked by a stranger. His left hand had been almost entirely severed between the knuckles and the wrist by a stroke from an ax; at the time of the injury, the hand was lying on a solid base. Two sharp-edged cuts on the skin of the lower joint of the index-finger, which ran parallel to the amputation and were at first interpreted as trial strokes, could not later be absolutely ruled out by surgeons as a result of medical treatment. A thorough examination of the hand showed that the wrist bone had two cuts, slightly inclined towards each other (illustrated by

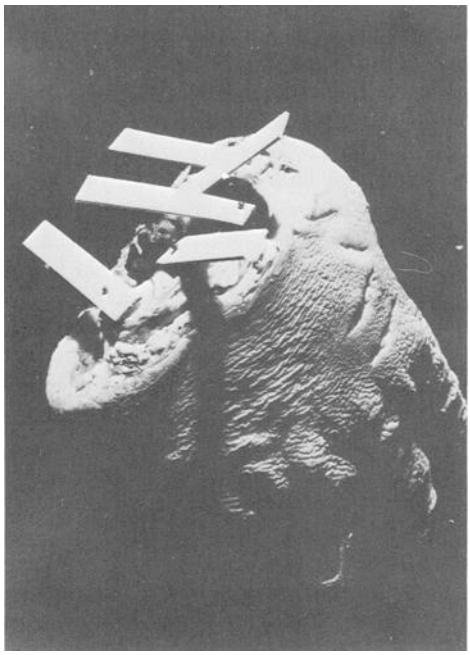

FIG. 4—*Amputated hand. The strips of paper indicate the different points of severance.*

strips of card in the diagram). The conclusion that there must have been two strokes did not, however, convince the court; particularly because a further expert opinion argued that a postmortem displacement of the severed wrist-bone through a pulled tendon could be the cause, although the two cuts, inclined towards each other, were situated in one and the same bone.

Questionable Injuries from Motorized Saws

With the increase in industrial and forestry accidents caused by motorized circular and band saws as well as by chain saws [*20–23*], the incidence of self-inflicted amputations with this type of equipment, has risen considerably, even though it has remained low in relation to the number of genuine accidental amputations [*24*]. Even Marz reported such a case and considered it impossible for an amputation to take place without the active resistance of the affected member [*7*]. Dern observed four thumb amputations [*19*], all across the lower joint, three of which affected the left thumb and one the right (of a left-handed person!). All the surfaces were even and perpendicular to the finger bone; in only one case was there a thin covering of skin remaining. In three of these cases, where it was established that only the thumb had been injured, it could not definitely be proved that the damage was deliberate. As insurance for high amounts had been taken out shortly beforehand in each case, however, the parties agreed to compromise. In the fourth case, besides the amputation straight across the thumb joint, there was an additional injury to the end of the index finger, on the thumb side. The reconstruction of the incident showed, with the help of traces of blood that were found, that the two fingers were not injured at the same time, but one after the other; and that, contrary to the injured person's statement, no plank could have possibly been lying on the sawing bench.

The literature does not usually contain an exact description of accidental injuries to the

fingers. MacFarlane [*21*] remarks that the nondominant hand is practically always affected in accidents involving chain saws, and that complete amputations of the finger are practically always accompanied by serious injuries to the soft parts of the adjoining fingers or the hand. Richter is of the opinion that wounds affecting one finger only are mostly to be found at the tip of the finger and those affecting several fingers more towards the base of the finger [*23*]. Isolated finger injuries are more unusual the more proximally (that is, the further down the finger joint) they occur. Complete amputations are rare. We ourselves assessed seven accidental injuries to fingers resulting from circular saws and chain saws. In one case the thumb and in one the index finger was cut in a longitudinal direction from the front (amputation did not occur—Fig. 5 shows a typical result); in two cases the index-finger had been cut on the diagonal from the side nearest to the thumb (in one case the first joint had been amputated), in two cases the injuries occurred at right angles to the finger axis and in each case two fingers were thereby affected (fourth and middle finger in one case and thumb and index finger in the other) and injuries to the bone did not exist at all (in one case) or were minimal (one case); in the seventh case, finally, an amputation of several fingers took place in a straight line running from the thumb to the fourth finger. Using this experience, one can thus say that as with injuries resulting from ax-blows, accidental amputations of the finger—total, at right angles, and proximal—virtually never occur without accompanying injuries to the hand or the adjoining fingers.

We ourselves had to assess a case in which a man alleged that he had been standing opposite the blade of the saw, using his left hand to push the pieces of wood that had already been cut away to the left-hand side of the blade. Then his thumb was caught by the cutting edge; the blade of the saw must have struck the thumb more or less from the front. At first examination, it was established that the thumb was severed just above the lower joint. Directly below the point of severance on the palm side of the hand was a second incision in the flesh. In the X-ray (Fig. 6) it could clearly be seen that the surface of the cut was at right angles to the thumb bone. The thumb must have been spread out as far as it would go, or overextended

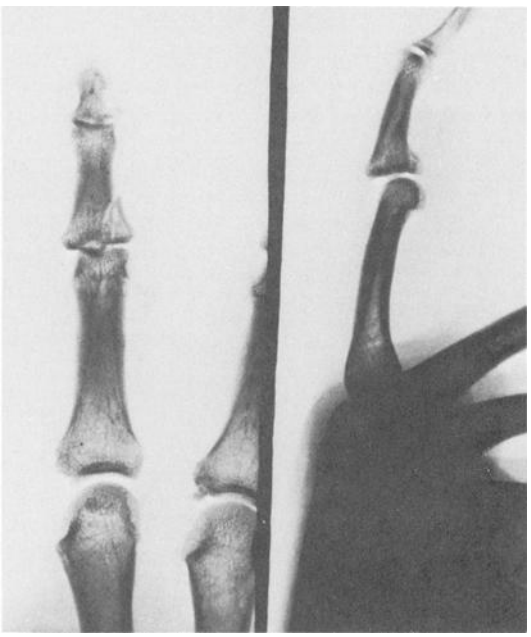

FIG. 5—*Typical injuries of the fingers caused by accidents with a circular saw.*

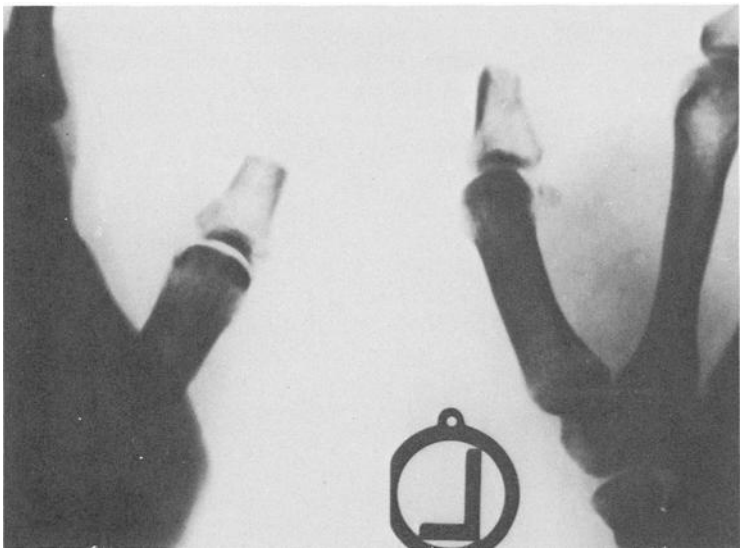

FIG. 6—*Typical result of deliberate amputation of the finger using a circular saw.*

when it was brought up against the blade of the saw. Such a position is not only physiologically unlikely but also (like the second incision) contradicts the statement of the man involved. His claim against the insurance company was later rejected because of a high court decision.

In the case of would-be accidents involving bench circular saws, the question sometimes arises as to whether the person concerned did not have enough time to react defensively, so that complete amputation could have been avoided. Fritze et al ascertained by means of experimentation that the time values listed in the literature as being necessary to completely sever fingers or even an arm are too high [*25*]. In fact, about 200 ms is necessary for the forearm, which is less than the time required for a flight reaction. As the saw's rate of incision depends on the mostly very rapid revolution speed of the circular saw, and as its firm standpoint cannot be compared to the mobile chain saw, we cannot apply these results to the following case.

A 36-year-old man, heavily insured, made a claim to his insurance company, alleging that he had amputated his left thumb and index finger while working in a forest with a chain saw weighing 4.7 kg. At the time of the accident he had been sawing elder shrubs. For this purpose he had pulled the elder clumps, which stood vertically, to the left with his left hand, guiding the saw with his right hand alone. He then stumbled and caught his left hand with the saw while it was still running. Both fingers were severed at once. The doctor treating him described the amputation injuries as lying in a straight line, with entirely smooth edges. The index finger was completely severed from the lowest joint, while a remnant of bone from the lowest joint of the thumb was still present. On the middle finger an accompanying surface injury was sustained on the side next to the index finger. With the same saw, we carried out experiments on the hands of corpses and ascertained that ragged injuries to the soft parts frequently occured, as well as entirely smooth-edged severances of the skin, soft parts, and the bone—very similar to the case to be judged (Fig. 7). It turned out, however, that at least 3 s were necessary for complete amputation, even if the fingers were placed on a firm base and the power saw was held with both hands, exerting considerable pressure. If one used only one hand to guide the saw, at least 7 or 8 s were necessary. If the fingers were not lying on a firm base, complete amputation did not occur at all. In all cases there remained at least the lowest tendon of the thumb and index finger and the skin of the flexible side of both fingers.

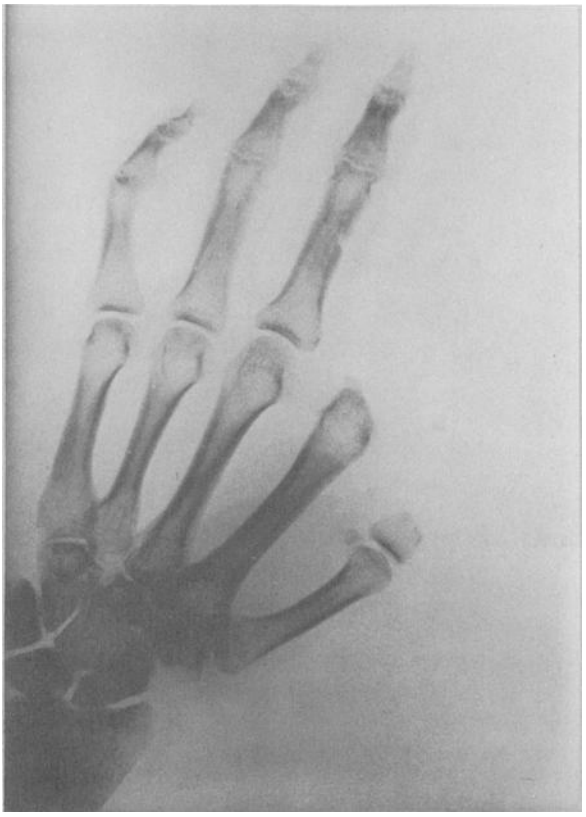

FIG. 7—*Result of an experiment with a corpse. Finger amputations caused by a chain saw.*

There can thus be no doubt that the insured party had enough time for a defensive reaction. The claim that the accident was not intentional could not thus be brought into line with the complete amputation of both fingers.

Questionable Injuries Resulting From Blunt Force

Although the most frequent form of finger amputations, according to Geldmacher [*26*], is nowadays attributed to a blunt trauma (pounding mechanisms, presses, or conveyor belts), we do not know of any case in which an attempt to defraud an insurance company relied on such a mechanism. What might be termed "blunt-sharp" force played a role in the following case.

A 27-year-old man maintained that in an attempt to jack up his car, which had a damaged tire, he had bumped against the car. As a result, the car slipped off the jack and fell onto the tire. In doing so, it had crushed his thumb. Surgical treatment showed that the thumb had been completely amputated across the lower joint, leaving a totally clean wound. The severed thumb itself could apparently no longer be found. One of the insurance companies involved became wary because the injured man's twin brother had been compensated for a thumb amputation two years previously. At the time, the brother had reported exactly the same kind of accident. A reconstruction of the alleged accident showed that one of the metal disks to be found on the open axle could have decended either onto the side area of the tire or onto the wheel rim (Fig. 8). In reconstruction attempts we thus put the hands of corpses in

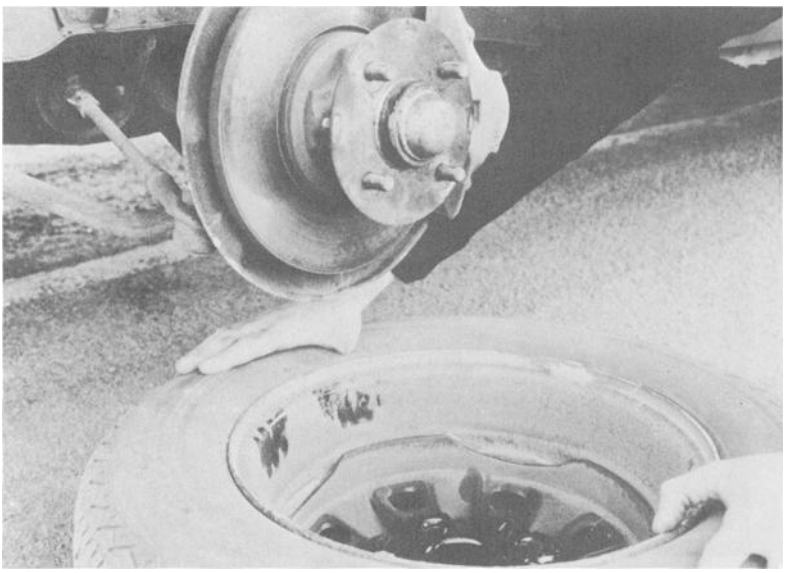

FIG. 8—*Reconstruction of the position of the hand at the time of the alleged accident.*

the same situation. It turned out that a surface injury running in a straight line resulted if the thumb was caught between the disk lying further towards the back and the surface of the tire on the side. If the experiment was so managed that the metal disk landed on the wheel rim, distortion of the metal either to the front or the back was the basic result, producing in one case diagonal chip-fractures of the lowest thumb joint, while in the other case clean fractures directly across the bone could be observed. In no case did we succeed in causing complete amputation of the thumb. As a matter of principle, a more or less wide bridge of tissue on the flexible side of the thumb remained, which was made up of at least the flexible tendon and the soft parts, including the skin (Fig. 9). Thus in this case the injuries exhibited could not be brought into line with the alleged accident.

Conclusions

The assessment of possibly self-inflicted mutilations with the purpose of uncovering an insurance fraud is undoubtedly one of the most difficult tasks to be found in forensic pathology. The insurance companies involved usually take heed only when it turns out that the person concerned has taken out insurance policies for unusually high sums and that several insurance companies are involved (each initially in ignorance of the others), or possibly when similar cases have occurred among the closer acquaintances or relatives of the insured party. By the time an expert is called on to give his opinion, the injuries in question have usually already healed and he is obliged to rely entirely on the report drawn up by the doctors who treated the person involved. It is highly desirable for written reports to be detailed and accurate and illustrated by X-rays (before the treatment) and also by photographs if possible—which unfortunately is not always the case.

As the expert's report usually focuses on the course of the accident as described by the victim and whether the injuries sustained could have resulted from it, a very exact reconstruction of the alleged accident is required. Often the insured party has made only an incomplete statement that is altered when the expert's report uncovers a particular circumstance that cannot be reconciled with the injuries sustained. In practice it has proved to be of value if the

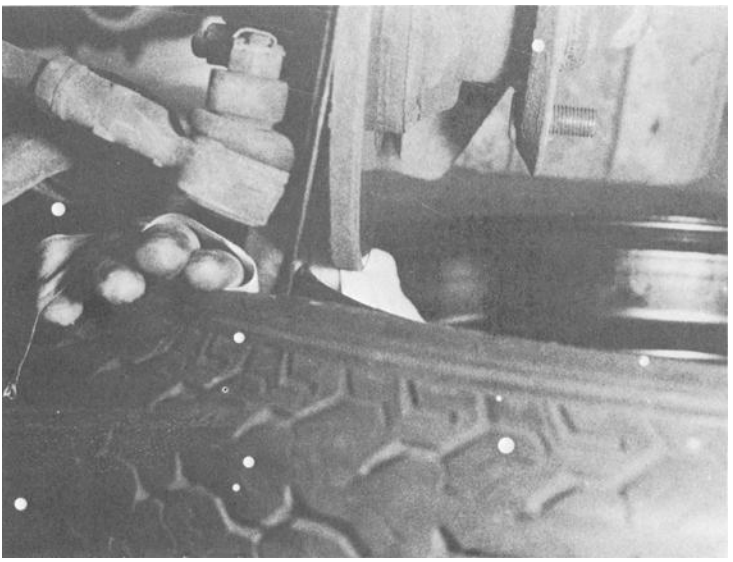

FIG. 9—*Result of an experiment with a corpse. Thumb is caught between axle and wheel rim, leading to incomplete amputation.*

expert making the report gets in touch with the insured party, questions him, and reconstructs the alleged course of the accident with his help. Plentiful photographic documentation of such attempts at reconstruction can be absolutely recommended. If the description of the accident is inexact, all feasible alternatives should be reconstructed. For reasons of expediency, one should first of all prepare a report covering the interview with the insured party, who should be given the opportunity to correct it and should then sign it to confirm its accuracy. Subsequent alterations in the statement are thus virtually impossible.

Positive circumstantial indications of a self-inflicted injury, which are often cited in the literature, such as the absence of witnesses, the removal of amputated fingers, and the subsequent tidying up of the alleged scene of the accident, have no place in the report of the forensic pathology expert, in our opinion. In our experience, judges are seldom inclined to place much weight on such circumstances.

The finding that unintentional injuries to the fingers customarily differ in a number of characteristics from those that are deliberately inflicted is generally valid for the expert drawing up a report. In an authentic accident, isolated finger amputations without accompanying injury to the adjoining fingers practically always occur peripherally and diagonally to the finger axis, or even parallel to it. Accidental diagonal amputations of the fingers can occur further down the finger; however, in the case of the longer fingers at least, they are always accompanied by injuries to the adjoining fingers. This is as true for accidents with an ax as for accidents with a power saw. Isolated total finger amputations, occurring proximally and at right angles to the finger axis, always point to an "execution" position, indicating that the injury was inflicted deliberately. Of course, this rule is not totally applicable to the thumb.

In many cases it will be necessary to check the alleged accident mechanism by experimenting with the hands of corpses. The most frequent question in the case of a would-be accident with an ax is whether the finger was lying on a firm base at the time of the accident or whether the spring mechanism would have prevented total amputation. In the case of an alleged accident with a saw, the time necessary for total severance should be ascertained; this is then linked to the question of whether the person concerned had enough time to react and

prevent total amputation. In the case of injuries with alleged blunt or blunt-sharp force, it should be determined whether this could have caused total amputation.

If the expert comes to the conclusion that the alleged accident mechanism is not consistent with the injury exhibited, then under West German law the evidence is sufficient that the injury was self-inflicted—and thus requires no compensation. As noted above, the police are not as a rule notified of suspected attempts to defraud insurance companies. The companies, for the most part, are concerned to make sure that the police are not notified while the dispute is being handled according to civil law, as a procedure under criminal law often results in acquittal according to the precept *in dubio pro reo* because of insufficient evidence, whereby prejudice had been created, compelling the dispute to be settled outside the law courts.

Summary

The foregoing article concerns itself with the difficulty of proving finger amputations to be deliberate and intended to defraud an insurance company. The criteria that have been customary up to now for differentiating between deliberate and accidental amputations are critically assessed by means of experimental investigations. With the help of several deductive observations, a procedure for an expert assessment is demonstrated. It is recommended that the insured party concerned be questioned by the expert himself, so as to reconstruct the alleged course of the accident with the help of the insured party as exactly as possible, and to discover by means of reconstruction attempts using the hands of corpses whether it is possible to cause amputation injuries corresponding to those exhibited.

References

[1] Schibler, W., Über Selbstverletzungen und künstliche Wunderhaltung zur illegalen Obtention von Versicherungsleistungen," *Hefte zur Unfallheilkunde*, Vol. 9, 1931, pp. 1-52.

[2] Jungmichel, G., "Über Selbstbeschädigungen," *Hefte zur Unfallheilkunde*, Vol. 48, 1955, pp. 172-185.

[3] Lochte, T., "Über Selbstverletzungen," *Vierteljahrsschrift für gerichtliche Medizin*, Vol. 45, 1913, pp. 261-276.

[4] Reischauer, F., "Das sog. chronische traumatische Handoedem als Modell der Analyse von Selbstbeschädigung," *Hefte zur Unfallheilkunde*, Vol. 48, 1955, pp. 185-193.

[5] Sasse, W. and Gruss, P., "Eine besondere Art der Selbstbeschädigung," *Monatsschrift für Unfallheilkunde*, Vol. 71, 1968, pp. 309-312.

[6] Thurau, M., "Seltene Artefakte," *Deutsche Zeitschrift für gerichtliche Medizin*, Vol. 43, 1955, pp. 545-551.

[7] Marz, E., "Unfall oder vorsätzliche Selbstbeschädigung bei einem Häftling? (Absägen der linken Hand durch eine elektrisch betriebene Bandsäge)," *Deutsche Zeitschrift für gerichtliche Medizin*, Vol. 15, 1930, pp. 279-284.

[8] Raestrup, G., "Versicherungsbetrug oder Unfall," *Deutsche Zeitschrift für gerichtliche Medizin*, Vol. 23, 1934, pp. 252-256.

[9] Lange, H., "Aussergewöhnliche Selbstbeschädigung," *Kriminalistik*, Vol. 23, 1969, pp. 38-40.

[10] Bürkle de la Camp, H. and Gross, C. L., "Verletzungen und Erkrankungen durch Selbstbeschädigung auf chirurgischem Gebiet," *Handbuch der Artefakte*, J. Mayr, Ed., Fischer-Verlag, Jena, Germany, 1937, pp. 237-296.

[11] Raestrup, O., "Selbstverstümmelungen (Fingerverletzungen) und private Unfallversicherung," *Monatsschrift für Unfallheilkunde*, Vol. 64, 1961, pp. 245-255.

[12] Nippe, M., "Unfall oder Selbstverstümmelung durch Abhacken von Daumen oder Fingergliedern," *Monatsschrift für Unfallheilkunde*, Vol. 45, 1938, pp. 65-71.

[13] Tanner, E. W., "Die Selbstbeschädigung in der Unfallversicherung," medical thesis, University of Zurich, Zurich, Switzerland, 1946.

[14] Schnabelmeier, H. L. and Mika, C., "Die traumatische Fingeramputation als Selbstverstümmelung und ihre chirurgische Begutachtung," *Monatsschrift für Unfallheilkunde*, Vol. 71, 1968, pp. 540-548.

[15] Dotzauer, G., "Selbstbeschädigungen," *Hefte zur Unfall-Heilkunde*, Vol. 94, 1968, pp. 188-193.

[16] Dotzauer, G. and Iffland, R., "Selbstverstümmelungen in der private Unfallversicherung," *Zeitschrift für Rechtsmedizin*, Vol. 77, 1976, pp. 237-288.
[17] Bonte, W. and Rüdell, E., "Fehlschlag oder gezielte Selbstverstümmelung? Die Wahrscheinlichkeit akzidenteller Verletzungen beim Beilhieb," *Archiv für Kriminologie*, Vol. 161, 1978, pp. 143-152.
[18] Bach, G., "Nachtrag zur Arbeit über Versicherungsbetrug durch Selbstverstümmelung von Fingern," *Schweizerische Medizinische Wochenschrift*, Vol. 20, 1939, p. 373.
[19] Dern, K., "Selbstverstümmelungen in der privaten Unfallversicherung," medical thesis, Hamburg, 1962.
[20] Henter, A., Milarch, R., and Hermanns, D., "Schwere Unfälle in Heim und Freizeit," Report 195 of the Bundesanstalt für Arbeitsschutz und Unfallforschung, Dortmund, West Germany, 1978.
[21] MacFarlane, I., "Forestry Injuries and Fatalities in New Zealand," *Journal of Trauma*, Vol. 20, 1980, pp. 383-389.
[22] Mader, F., "Unfall-Statistik 1977. Ihre Holz-Berufsgenossenschaft informiert," *Holz-Berufsgenossenschaft-Mitteilungen*, Vol. 15, 1977, pp. 13-15.
[23] Richter, O., "Versuche über Handhaltung und Fingerstellung bei Kreissägen-Verletzungen," *Zeitschrift für die gesamte medizinische Gutachtertätigkeit*, Vol. 68, 1971, pp. 59-61.
[24] Stucke, K., "Unfall durch Sägemaschinen," *Hefte zur Unfallheilkunde*, Vol. 43, 1952, pp. 65-68.
[25] Fritze, A., Preuschoft, H., and Fritz, M., "Neue Erkenntnisse zu Unfällen mit Tisch-Kreissägen," *Zeitschrift für Rechtsmedizin*, Vol. 85, 1980, pp. 107-118.
[26] Geldmacher, J., "Handverletzungen am Arbeitsplatz," *Monatszeitschrift für Unfall-Heilkunde*, Vol. 71, 1968, pp. 525-531.

Address requests for reprints or additional information to
Wolfgang Bonte, M.D.
Institute of Legal Medicine
University of Goettingen
Federal Republic of Germany