

# The Seriously Uninjured Hand — Weakness of Grip

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*Loss of grip is a rateable factor in the determination of permanent disability by compensation boards in some states. Malingerers, or those with psychological rather than organic disability, can voluntarily record lower grip measurements in the so-called injured hand when compared with the normal hand. The purpose here is to provide an objective method of documenting real, as opposed to fictitious, loss of grip. This method utilizes the sealed hydraulic dynamometer which has been adopted by some states as a standard grip measuring device. Its isometric and adjustable features have been utilized in this study to aid in the evaluation of the patient who complains of loss of grip with no objective recordable findings. The patient who is voluntarily attempting to demonstrate weakness of grip will apply the same minimal pressure at each of the adjustable handle positions, producing a straight line graph. In our series of patients thought to be voluntarily applying minimal grip, there has been a variance of 5 lb, or less at each of the handle positions. An objective statement can then be made that the patient did not cooperate with the test through his failure to apply maximal pressure at each dynamometer handle position as instructed.*

Of the hundreds of thousands of hand injuries that occur each year, a number will ultimately result in some permanent anatomic or functional impairment. We must provide, either to some body of law or to an insurance company, our estimate of that permanent partial impairment. Loss of grip force is a rateable factor in the determination of permanent disability by compensation boards in some states.<sup>1,2</sup> Malingerers, or those with psychological rather than organic disability, can voluntarily record lower grip measurements in the so-called injured hand when compared with the normal hand. In these instances, the examining physician must make his own subjective statement that the patient may be malingering or perhaps was not applying maximal effort. The purpose here is to provide an objective method of documenting real, as opposed to fictitious, loss of grip. Weakness of grip will be obvious in certain situations such as with partial or complete amputations or with limited motion of the hand or digits, or with pain or muscular weakness. The patient whose main com-

plaint is weakness or loss of grip, with no objective clinical findings, will typically present with a history of minimal injury producing inability to carry on effectively with his former occupation because of his weakness of grip.

## Sealed Hydraulic Dynamometer

An objective, reproducible method of documenting voluntarily diminished grip strength is available. The sealed hydraulic dynamometer, which registers force in pounds, has been adopted by some states as a standard grip measuring device (Fig. 1). Its system is equipped with a gauge that is calibrated in pounds per square inch. When grip force is applied, only a fraction of an inch of motion is required to produce a maximum reading of 200 lb. This isometric feature is important in that the patient is unable to observe the distance that he has moved the handle in his grasp. The handle was designed to be adjustable to accommodate any sized hand or any hand that may have limitation of finger joint motion.<sup>3</sup> The combination of the isometric and adjustable features has been utilized in this study to aid in the evaluation of the patient who complains of loss of grip with no objective recordable findings.

## Testing the Patient

The patient is tested with the dynamometer, with the adjustable handles, recording grip force at each of the five handle positions (Fig. 2). This is done first with the normal or uninjured hand. The patient is instructed at each handle position to apply his maximal grip. The reading at each position is recorded and the composite readings are then graphed, producing a slightly skewed bell curve with the lower readings at the extremes of the handle positions and the highest reading in the midposition. The peak of the bell curve occurs at this position because there is full function of the profundus, superficialis and interosseous muscles. The widest position uses mostly the profundus muscle. The next position allows the superficialis to be added and then, in midposition, the interossei come into play. At the lowest, or first position, profundus and superficialis excursion is fully used, therefore contributing very little to the overall grip strength. The patient who has true weakness of grip will have demonstrable diminution of grip strength when compared with the uninjured hand; however, the same slightly skewed bell curve will be present (Fig. 3). The patient who is voluntarily attempting to

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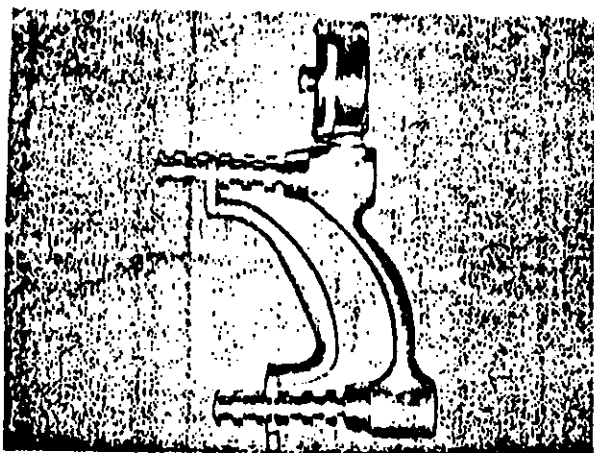


Fig. 1 - Jamar dynamometer for grip measurement.

demonstrate weakness of grip will apply the same minimal pressure at each of the positions, producing a straight line on the graph (Fig. 4). In our series of patients thought to be voluntarily applying minimal grip, there has been a variance of 5 lb or less at each of the handle positions. The statement can be made that the patient did not cooperate as he was instructed with the test by his failure to apply maximal pressure at each of the five positions on the dynamometer handle. There can be no question as to his understanding the test, as demonstrated by the normal bell curve for the normal or uninjured hand.

In the evaluation of grip strength of a patient who would have us believe that his grip is weaker than it truly is, the straightforward reporting of numerical readings, taken from the dynamometer, is considered inadequate and misleading to lay persons who sit in judgment of the patient's total impairment.

The graphic curve produced by the composite of readings is presented as objective evidence that the patient was either cooperating or was not cooperating with the test by applying the maximal pressures, as instructed at each of the handle positions. Care must be taken that the patient

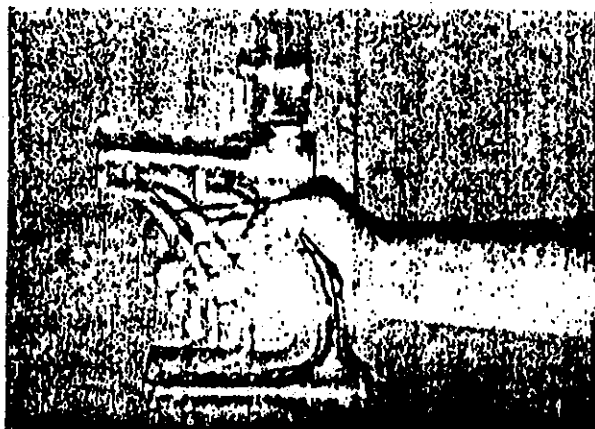


Fig. 2 - Grip is measured at each handle position.

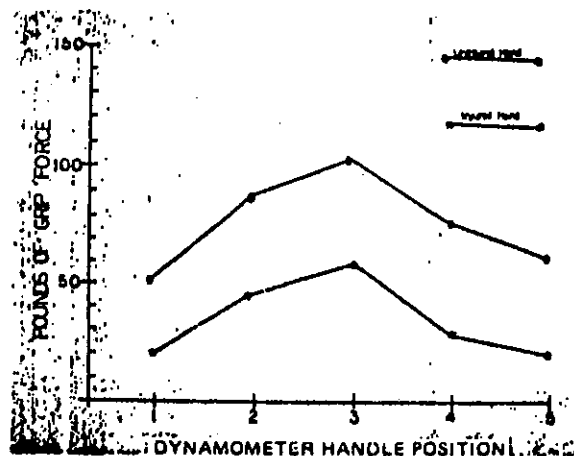


Fig. 3 - Demonstrating true weakness of grip.

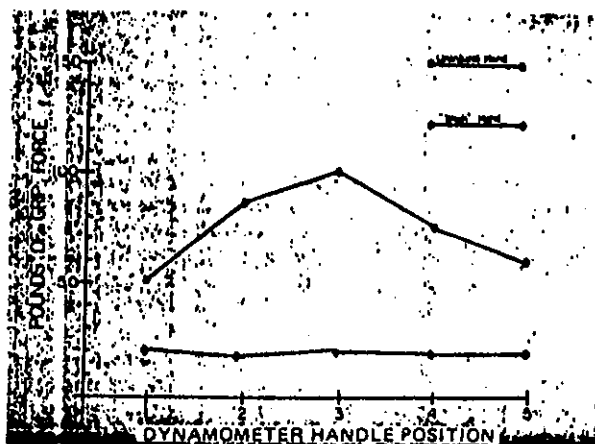


Fig. 4 - Patient applying same minimal pressure to give appearance of weakness.

holds the dynamometer in his hand in the same manner, regardless of handle position. The dynamometer must be firmly seated in the first web space. The patient should not be able to see the dial, and therefore know what he is recording. He will apply the same minimal grip at each of the handle positions in an effort to demonstrate his weakness.

Utilizing this graph method of recording grip strength, rather than reporting simple and misleading numerical values, the physician can objectively document real, as opposed to fictitious, loss of grip, and can avoid subjective or argumentative statements relative to the patient's lack of cooperation.

## References

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