

under joint replacement, the two treatments are HIP PROSTHESIS and KNEE REPLACEMENT.

The treatment hierarchy shown in FIG. 20 has four levels, numbered 0 through 3, as shown. The broad category of INTERNAL treatments is at level 0, IMPLANT and JOINT REPLACEMENT are at level 1, PLATE, NAIL, HIP PROSTHESIS and KNEE REPLACEMENT are at level 2 and DHS™, CONDY-LAR, ENDER'S and LOCKING are at level 3. A total score for each of the most specific treatments (DHS™, CONDY-LAR, ENDERS, LOCKING, HIP PROSTHESIS and KNEE REPLACEMENT) can be determined as follows. The certainty factors associated with each of the treatments shown in FIG. 20, as determined by the rules implicated by the TREATMENT goal and indicated in parenthesis underneath each treatment, are multiplied by a weighting factor, such that the certainty factors associated with the more specific treatments are more heavily weighted than those associated with the broader treatment categories. In the present example, a weighting factor equal to four plus the number of the level of treatment, equals the weighting factor. As shown the certainty factors are multiplied by 4, in level 0, by 5 in level 1, 6 in level 2, and so on. It should be noted that this specific weighting function is exemplary, and others may be found to be more suitable for particular applications.

After multiplying the certainty factor of each treatment suggestion by the weighting factor, the individual totals for each of the most specific (highest level) treatments are added to the individual totals in each of its parent categories, up to and including the broadest category (level 0). For example, the individual total for DHS™, is 560. This figure is added to the figure for its parent (PLATE=90), its grandparent (IM-PLANT=85) and its great-grandparent INTERNAL (=60), to yield a total score of 795. The higher the score, the more highly the specific treatment is recommended. A selected number of the most highly recommended treatments may be displayed, as illustrated in FIG. 16. It will be noted that in FIG. 16, the information within icons 66, 68, 70 and 72 generally indicate treatment hierarchy for the respective treatment.

Thus, the present invention provides a highly sophisticated system for providing a set of recommended treatments for specific categories of physical trauma, using state-of-the-art expert system technology. Various changes and variations to the present invention will occur to those skilled in the art in view of the foregoing description. For example, other types of physical trauma, in addition to orthopedic fractures will find equally suitable implementation using the techniques in accordance with the present invention. It is also intended that the particular classification of orthopedic fractures, treatments, and other database information be exemplary, rather than limiting, and that all such changes and variations be encompassed so long as the present invention is employed, as defined by the following claims.

What is claimed is:

1. An expert system for providing to a user one or more suggested treatments for a patient with physical trauma, comprising:

- a computing device having a memory;
- a plurality of data bases in the memory including graphical illustrations of different types of physical trauma, and a knowledge base having rules for

- relating trauma and patient characteristics to treatments for said different types of physical trauma;
 - an application program, for execution in the computing device, for interactively displaying a series of screens including at least some of the graphical illustrations, to thereby elicit responses from the user concerning the specific type of physical trauma and specific characteristics of the patient, to thereby produce a further data base containing said trauma and patient characteristics; and
 - an inference engine program, for execution in the computing device, for use with said rules and said further data base, for selecting the one or more suggested treatments by stepping through a forward chaining sequence of rules relating to a particular treatment, and then by stepping through a backward chaining sequence of rules, the reverse of the forward chaining sequence, in which said rules are tested, based on said trauma and patient characteristics, to determine the desirability of said particular treatment;
 - the application program presenting the suggested treatments to the user after execution of the inference program.
2. An expert system for providing to a user one or more suggested treatments for a patient with an orthopedic fracture, comprising:
- a computing device having a memory;
 - a plurality of data base in the memory, including graphical illustrations of different classifications of orthopedic fractures; and a knowledge base having rules for relating trauma and patient characteristics to treatments for said different types of physical trauma;
 - an application program, for execution by the computing device, for interactively displaying a series of screens on a display, including at least some of the graphical illustrations, to thereby elicit responses from the user concerning the specific classification of orthopaedic fracture, and specific characteristics of the patient; to thereby produce a further data base containing said trauma and patient characteristics; and
 - an inference engine program, for execution in the computing device, for use with said rules and said further data base, for selecting the one or more suggested treatments by stepping through a forward chaining sequence of rules relating to a particular treatment, and then by stepping through a backward chaining sequence of rules, the reverse of the forward chaining sequence, in which said rules are tested, based on said trauma and patient characteristics, to determine the desirability of said particular treatment;
 - the application program presenting the suggested treatments to the user after execution of the inference program.
3. A method for providing to a user a suggested treatment for a patient having physical trauma, comprising the steps of:
- creating at least one knowledge base containing rules that relate different types of physical trauma characteristics and patient characteristics to different types of treatments for physical trauma;
 - eliciting information from said user concerning characteristics of said patient including the type of physical trauma sustained by said patient, to