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(54) **SWING FAULT-CORRECTION MATRIX**

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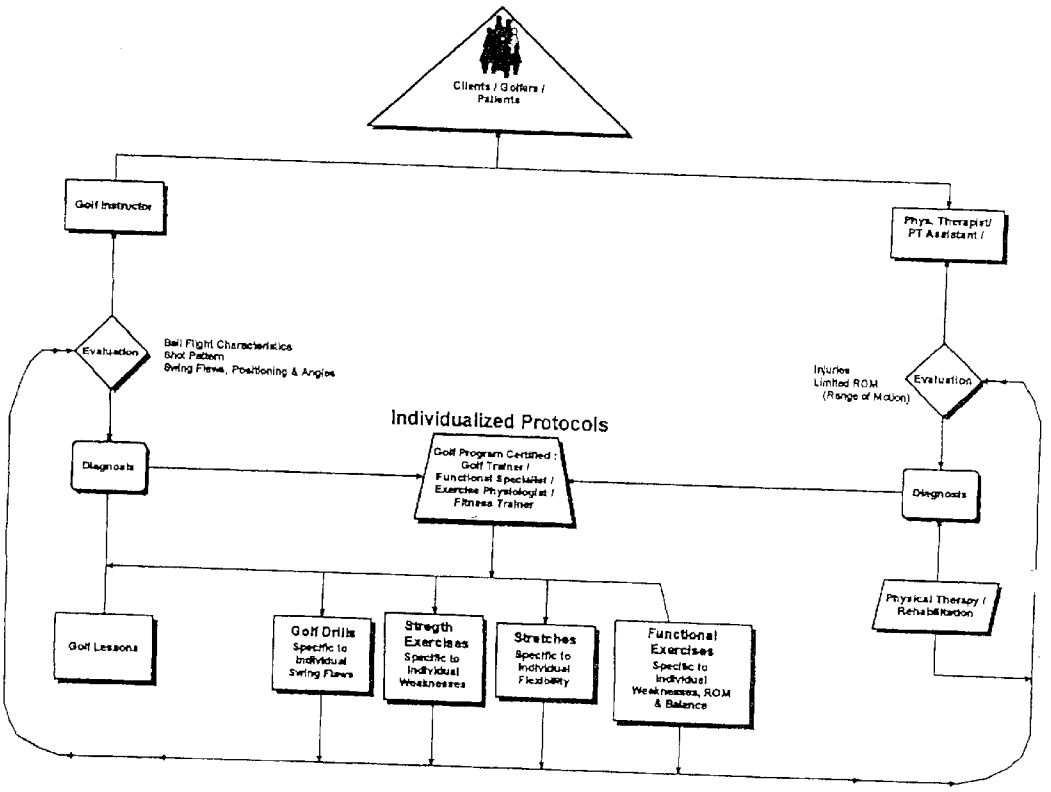
(57) **ABSTRACT**

A swing fault-correction matrix method and apparatus provides a means to analyze the deficiencies associated with a golfer's swing and further provide a specific training and rehabilitation program to correct the identified deficiencies. The swing fault-correction matrix includes a golf pro analysis component, a mechanical causes component and a physical causes component to identify the specific deficiencies created by the golfer's swing. The swing fault-correction matrix also includes a golf drills component, strength exercises component, stretches component and functional exercises component to provide remedies to the corresponding swing deficiencies identified by the swing fault-correction matrix.



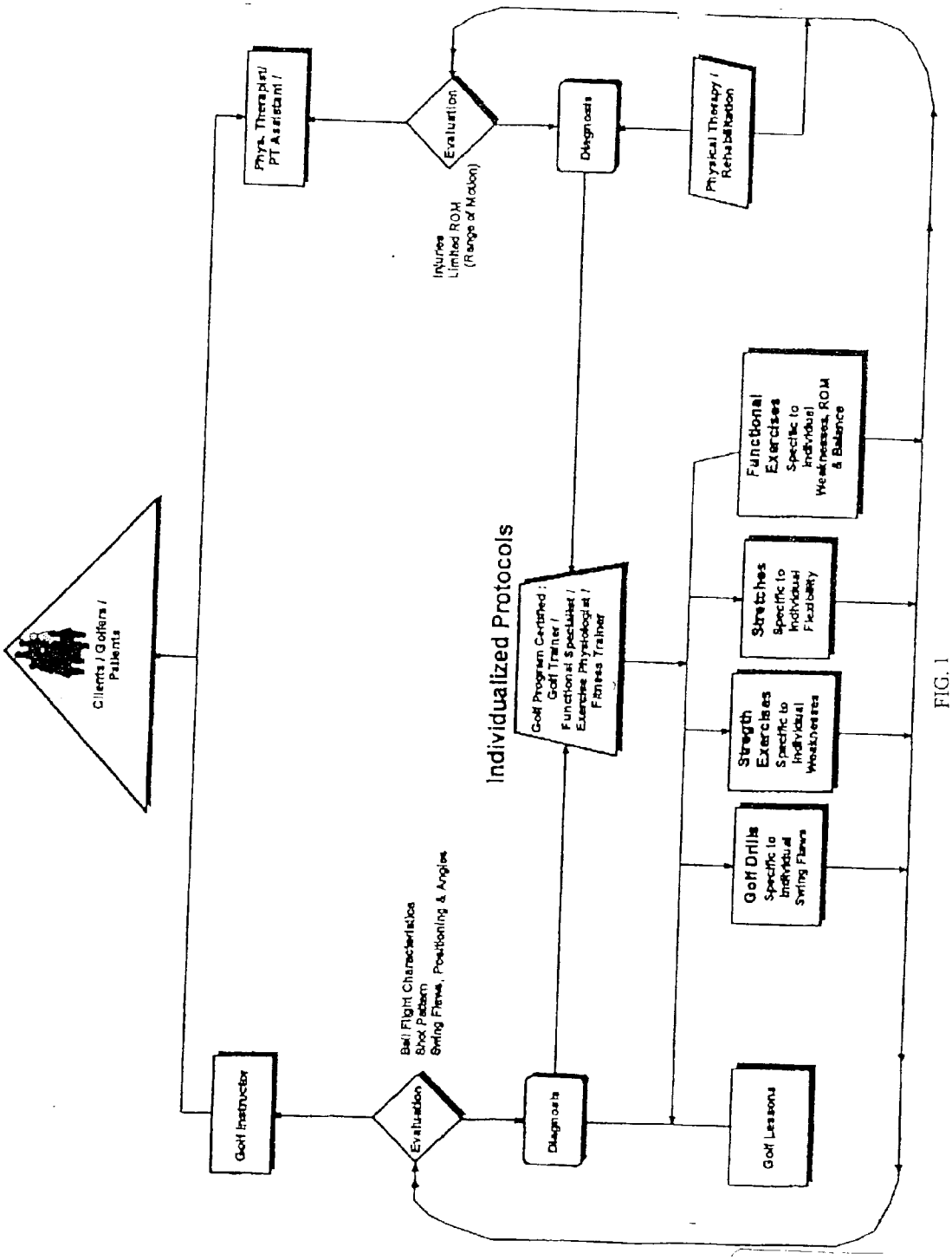

Clients / Golfers / Patients
Phys. Therapist/ PT Assistant /
Evaluation
Injuries
Limited ROM
(Range of Motion)
Diagnosis
Physical Therapy / Rehabilitation
Individualized Protocols
Golf Program Certified: Golf Trainer / Functional Specialist / Exercise Physiologist / Fitness Trainer
Functional Exercises Specific to Individual Weaknesses, ROM & Balance
Stretches Specific to Individual Flexibility
Strength Exercises Specific to Individual Weaknesses
Golf Drills Specific to Individual Swing Flaws
Golf Lessons
Golf Instructor
Evaluation
Ball Flight Characteristics
Shot Pattern
Swing Flaws, Positioning & Angles
Diagnosis

FIG. 1

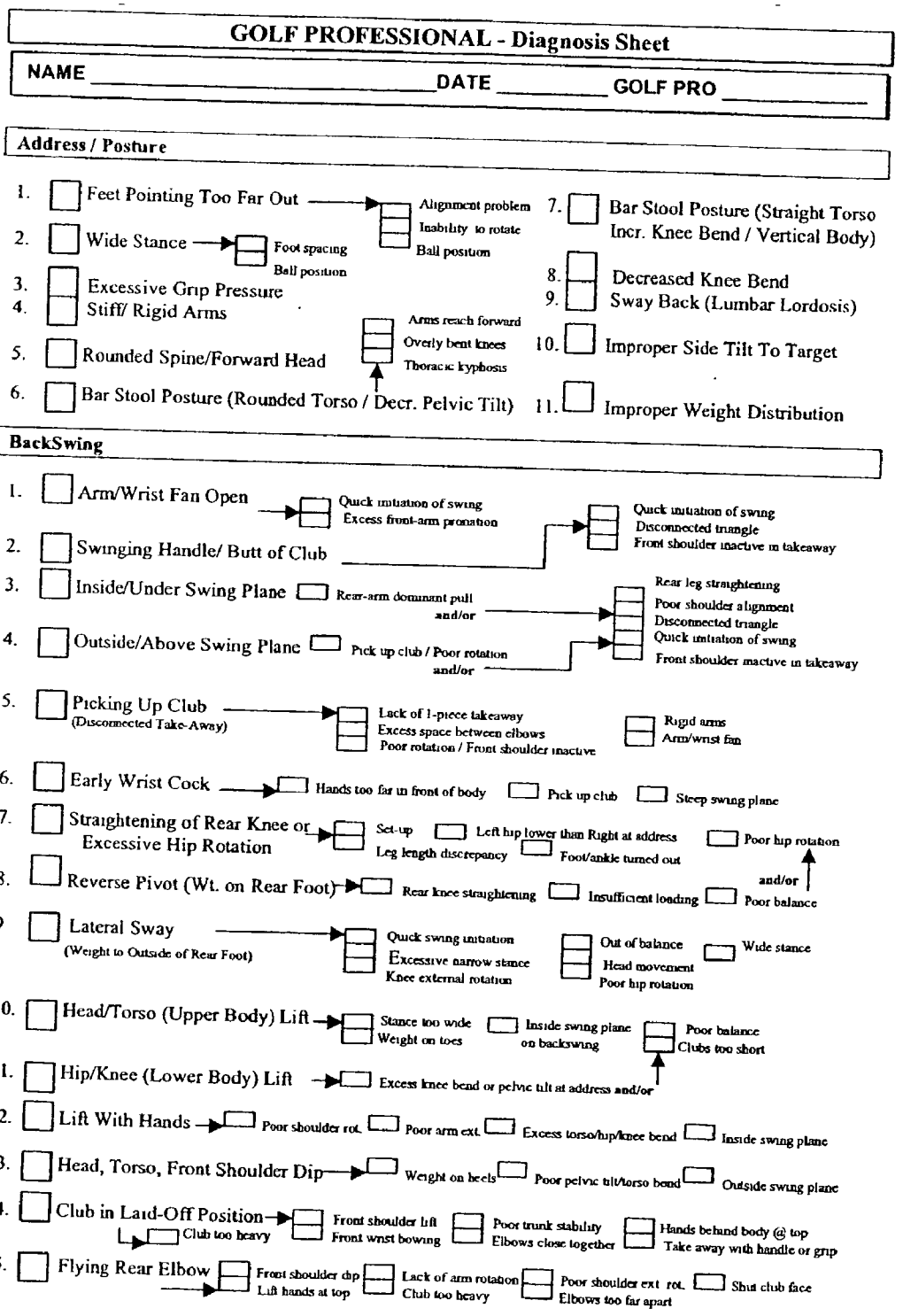


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FIG. 2

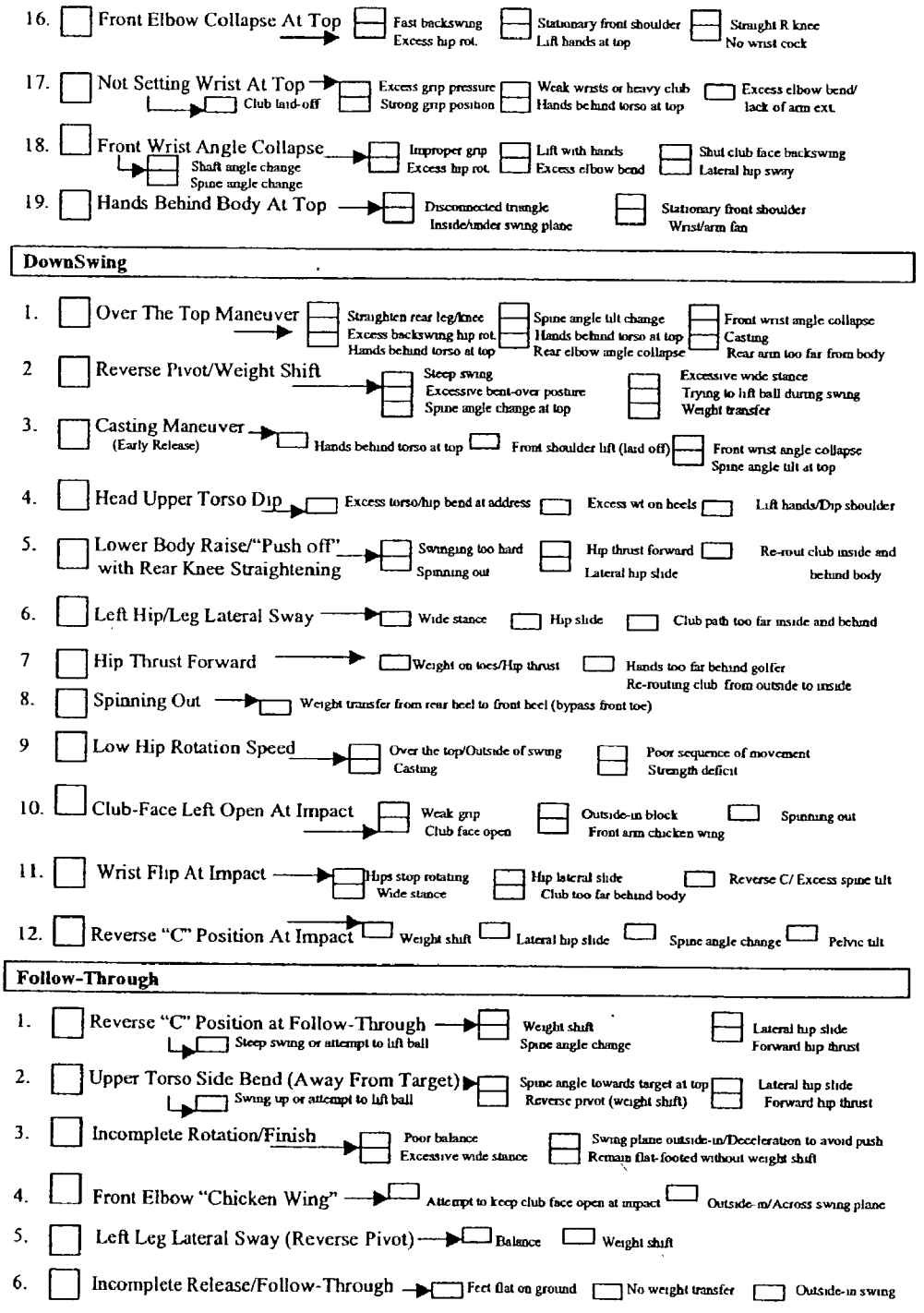
16. Front Elbow Collapse At Top
Fast backswing
Excess hip rot.
Stationary front shoulder
Lift hands at top
Straight R knee
No wrist cock
17. Not Setting Wrist At Top
Club laid-off
Excess grip pressure
Strong grip position
Weak wrists or heavy club
Hands behind torso at top
Excess elbow bend/
lack of arm ext.
18. Front Wrist Angle Collapse
Shaft angle change
Spine angle change
Improper grip
Excess hip rot.
Lift with hands
Excess elbow bend
Shut club face backswing
Lateral hip sway
19. Hands Behind Body At Top
Disconnected triangle
Inside/under swing plane
Stationary front shoulder
Wrist/arm fan
DownSwing
1. Over The Top Maneuver
Straighten rear leg/knee
Excess backswing hip rot.
Hands behind torso at top
Spine angle tilt change
Hands behind torso at top
Rear elbow angle collapse
Front wrist angle collapse
Casting
Rear arm too far from body
2 Reverse Pivot/Weight Shift
Steep swing
Excessive bent-over posture
Spine angle change at top
Excessive wide stance
Trying to lift ball during swing
Weight transfer
3. Casting Maneuver
(Early Release)
Hands behind torso at top
Front shoulder lift (laid off)
Front wrist angle collapse
Spine angle tilt at top
4. Head Upper Torso Dip
Excess torso/hip bend at address
Excess wt on heels
Lift hands/Dip shoulder
5. Lower Body Raise/"Push off"
with Rear Knee Straightening
Swinging too hard
Spinning out
Hip thrust forward
Lateral hip slide
Re-rout club inside and
behind body
6. Left Hip/Leg Lateral Sway
Wide stance
Hip slide
Club path too far inside and behind
7 Hip Thrust Forward
Weight on toes/Hip thrust
Hands too far behind golfer
Re-routing club from outside to inside
8. Spinning Out
Weight transfer from rear heel to front heel (bypass front toe)
9 Low Hip Rotation Speed
Over the top/Outside of swing
Casting
Poor sequence of movement
Strength deficit
10. Club-Face Left Open At Impact
Weak grip
Club face open
Outside-in block
Front arm chicken wing
Spinning out
11. Wrist Flip At Impact
Hips stop rotating
Wide stance
Hip lateral slide
Club too far behind body
Reverse C/ Excess spine tilt
12. Reverse "C" Position At Impact
Weight shift
Lateral hip slide
Spine angle change
Pelvic tilt
Follow-Through
1. Reverse "C" Position at Follow-Through
Steep swing or attempt to lift ball
Weight shift
Spine angle change
Lateral hip slide
Forward hip thrust
2. Upper Torso Side Bend (Away From Target)
Swing up or attempt to lift ball
Spine angle towards target at top
Reverse pivot (weight shift)
Lateral hip slide
Forward hip thrust
3. Incomplete Rotation/Finish
Poor balance
Excessive wide stance
Swing plane outside-in/Deceleration to avoid push
Remain flat-footed without weight shift
4. Front Elbow "Chicken Wing"
Attempt to keep club face open at impact
Outside-in/Across swing plane
5. Left Leg Lateral Sway (Reverse Pivot)
Balance
Weight shift
6. Incomplete Release/Follow-Through
Feet flat on ground
No weight transfer
Outside-in swing

FIG. 2

Golf Pro Analysis	Mechanical Causes	Physical Causes	Stretches	Functional Ex.	Machine Exercise	Free Wt/Pulley Exercise	Golf Drills
ADDRESS POSTURE							
1. Foot Positioning/ Alignment (Feet/Feet pointing too far out)	Alignment/set-up problems Inability to rotate @ backsw and follow-through Ball position	Weak hip internal rotators Limited hip internal rotation Tight piriformis Tight IT-band	Hip internal rotation stretch Piriformis stretch, Cobra stretch IT-band stretch, Hip maneuver	"Hips"club shake Weight shift curls Ball twist	Int rot (Adduction mach)	Knees together/separate ankles with bands	Alignment drill - railroad tracks clubs as reference lines
2 Wide Stance	Foot spacing Ball position	Poor balance, leg / hip weakness		Multi reach, Medial step down, Adm squat Sidestep w/ theraband, "Hips" club shake	Leg ext /leg curl Leg press Abduction/adduction	Squats/lunges/vert shins Wall squats Side-lying abduction Lateral lunges	Stance width drill
3 Excessive Grip Pressure							Squeeze then relax drill
4 Stiff/Rigid Arms							Squeeze then relax drill
5 Rounded spine, forward head (kyphosis)		Poor thoracic mobility Tight pec minor Tight lats, dorsi Tight hamstrings Weak parascapular	Side-lying trunk rotation, Cobra stretch, Corner stretch Chest stretch (swiss), Prayer stretch (swiss), Seated H stretch, Standing H stretch	Ball twist, Shoulder prot/retr.,Punching Address squat Shoulder prot/retr with tubing/cable	MedX rot torso Lat pulldown (T/A) Row Row (scap retraction) Pullover	Torso rotation (T band) Lat pulldown/chin up High/low row Bent-arm pullover(bench) Str -arm pullover(cable)	Hold long stick behind glutes assuming address position Head band = pull chin inward over spine drill
		Weak cervical spine Weak spinal ext. Weak legs and hips		Punching, Prot/retr Back ext (swiss) Address squat, Multi reach, Medial step down, Side-step w/ theraband	MedX cervical ext MedX lumbar Leg ext/leg curl Leg press	Manual cerv ext/head strap Squats/lunges/vert shins Wall squats Side-lying abduction Lateral lunges	
6. "Bar Stool Posture" with excess rounded shlders/spine (kyphosis) w/ decreased pelvic tilt, excessive knee bend & arm extension	Increased thoracic kyphosis, no pelvic tilt, decreased lumbar lordosis, overly bent knees, arms reaching forward	Weak hamstrings Weak parascapular Weak thoracic ext muscles+D26 Tight hamstrings Tight pectoralis minor	Corner stretch Hamstring stretch in standing/sitting Chest stretch (swiss), Corner stretch, Side-lying trunk rotation	Multi reach,Hip turn lunge, Address sq. Shoulder prot/retr with tubing/cable, Address squat Trunk ext (swiss)	Leg Curl Row Row (scap retraction) MedX lumbar	High/low row Row (scap retraction) Lat pulldown/chin up	Set-up, 'butt out' knee band drill Squeeze shoulder blades together, glutes out & band from hips, relax knees drill
7 Straight/Vertical hip		Weak quadriceps		Medial step down,	Leg ext		Set-up knee band drill

FIG. 3

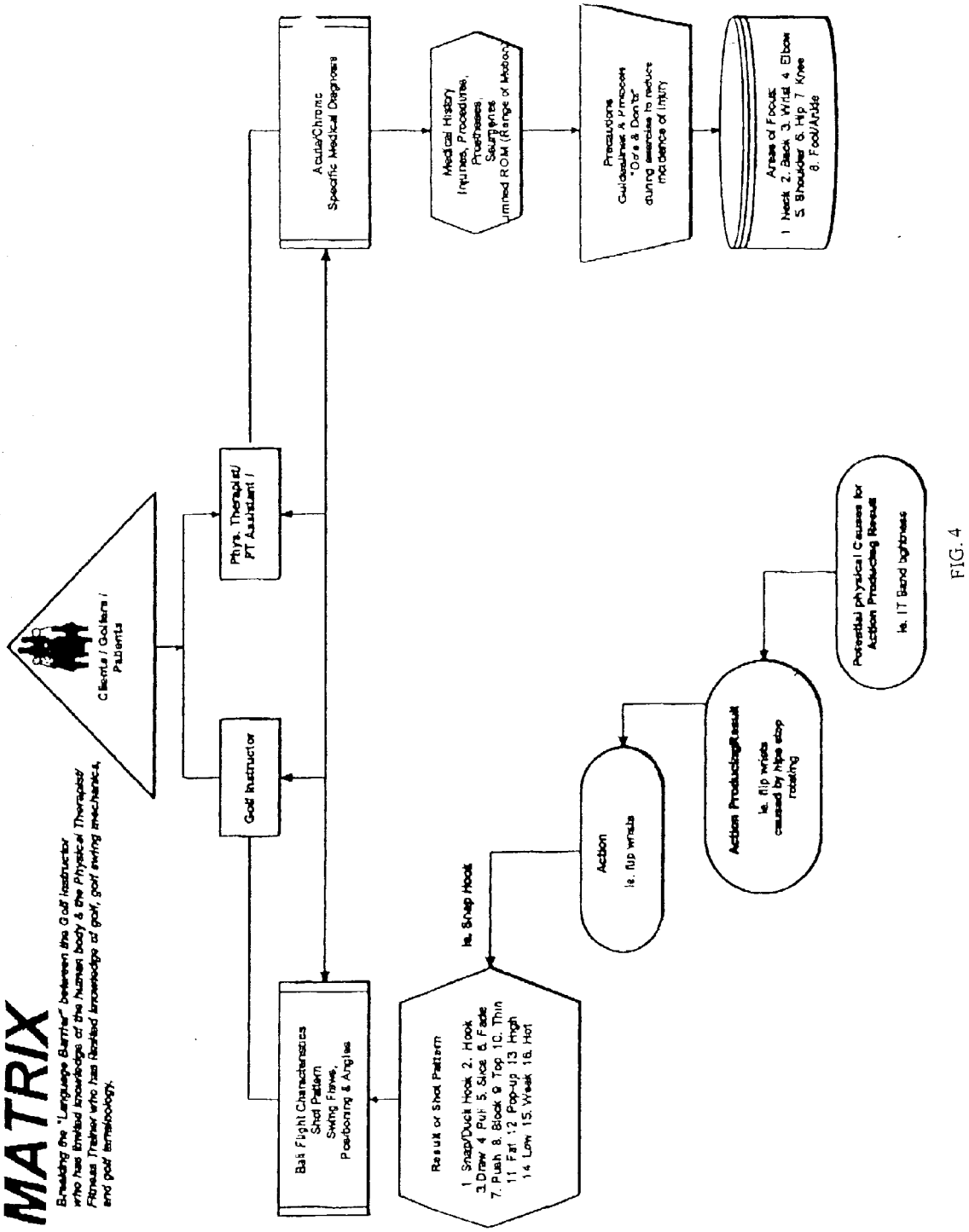
MATRIX
Bridging the "Language Barrier" between the Golf Instructor who has limited knowledge of the human body & the Physical Therapist/ Fitness Trainer who has limited knowledge of golf, golf swing mechanics, and golf terminology.
Clients / Golfers / Patients
Phys. Therapist/ PT Assistant /
Golf Instructor
Acute/Chronic Specific Medical Diagnoses
Medical History Injuries, Procedures, Prostheses, Surgeries Limited ROM (Range of Motion)
Precautions Guidelines/ Principles "Do's & Don'ts" during exercise to reduce incidence of injury
Areas of Focus 1. Neck 2. Back 3. Wrist 4. Elbow 5. Shoulder 6. Hip 7. Knee 8. Foot/Ankle
Ball Flight Characteristics Shot Pattern Swing Flaws, Positioning & Angles
Result or Shot Pattern
1. Snap/Duck Hook 2. Hook 3. Draw 4. Pull 5. Slice 6. Fade 7. Push 8. Block 9. Top 10. Thin 11. Fat 12. Pop-up 13. High 14. Low 15. Weak 16. Hot
Ie. Snap Hook
Action
Ie. flip wrists
Action Producing Result
Ie. flip wrists caused by hips stop rotating
Potential physical Causes for Action Producing Result
Ie. IT Band tightness

FIG. 4

SWING FAULT-CORRECTION MATRIX

CROSS REFERENCE TO RELATED APPLICATIONS

[0001] The present application claims the benefit of U.S. provisional patent application No. 60/315,499 filed on Aug. 28, 2001, the entirety of which is incorporated herein by reference.

STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT

[0002] (Not Applicable)

BACKGROUND OF INVENTION

[0003] 1. Technical Field

[0004] The present invention relates to method and apparatus for golfing. More particularly, the invention relates to a method and apparatus for identifying and correcting golf swing deficiencies.

[0005] 2. Description of the Related Art

[0006] While undoubtedly there have been many efforts on behalf of golf instructors and physical therapists to work with golfers to improve both golf abilities and the physical being of individuals, there has not been previously a highly defined coordinated approach which carefully analyzes the golf swing in terms of physical deficiencies and then seeks to fully analyze such physical deficiencies in terms of mechanical causes and physical causes. There is also lacking in the prior experiences the application of a fundamentally sound program utilizing stretching and various exercises that are then coupled with specific golf drills. Thus, lacking in a coordinated approach is a method and apparatus providing the ability to not only analyze the deficiencies but attend to such deficiencies with precision, outlining stretches, exercises and drills to correct such deficiencies.

SUMMARY OF THE INVENTION

[0007] Accordingly, it is an object of the present invention to develop a swing fault-correction matrix method and apparatus enabling a careful analysis of mechanical and physical causes for certain golf swing deficiencies.

[0008] It is a further object of the invention to then provide the necessary rehabilitation and exercises also combined with specific golf drills to have a unified improvement approach where physical exercises and stretching are integrated with specific golf drills to enable golf improvement to take place hand in hand with physical improvements to the body.

[0009] Further it is an object of the present invention to break down and analyze components of the golf swing in terms of both mechanical and physical causes and then provide a training program wherein at least one of a golf professional and a physical therapist can monitor progress of the golfer/client.

[0010] In summary, under the integrated program, the public, i.e., known as clients, golfers, and patients, will first be evaluated by a golf instructor and a physical therapist. Of course a golf instructor with physical therapeutic training or a physical therapist highly skilled in golf techniques can singularly analyze a patient for both the golf issues and the physical limitations issues as well.

[0011] On the golf side, an evaluation will take place of such issues as ball flight characteristics, shot pattern, swing flaws, and generally positioning before, during, and after the swing.

[0012] On the physical therapy side, the physical disabilities of various injuries, limited range of motion, lack of strength, and so forth will be evaluated.

[0013] Both evaluations will result and lead to diagnostics directed to specific issues and individualized protocols will be developed that generally relate to golf drills, strength exercises, stretches, and functional exercises.

[0014] These specific individual protocols will lead to further evaluations and will be integrated into a combined golf lesson/physical therapy format to carefully monitor simultaneously the golfer's improvement with golf in combination with physical response to the rehabilitation program.

[0015] More specifically and as an integral part of the clinical individual protocols, a swing fault/correction matrix has been designed to facilitate the golf training and rehabilitation program, as it is simultaneously being conducted.

[0016] The matrix first contains a golf pro analysis and in conjunction therewith a listing of mechanical causes that are associated with the analysis.

[0017] In general, the golf pro analysis is applied to four main components of the golf swing, i.e., the address/posture position, the back swing, the down swing, and the follow through. The mechanical causes will be noted in conjunction with the major swing flaws that are identified.

[0018] Associated with the analysis and listing of mechanical causes, a third analysis, i.e., physical causes, identifies certain common or known physical deficiencies which may be related to each mechanical fault. At this point the initial analysis will have been completed and the matrix will then provide suggested remedies to meet the identified golf and physical shortcomings. Generally, suggested treatment will come under one of four general categories, either strength exercises, functional exercises, specific stretches, and golf drills that are specific to individual swing flaws. In most instances, a rehabilitative or improvement approach will comprise one or more of stretches, strength exercises, functional exercises, and golf drills.

[0019] The matrix is utilized through the use of a golf professional diagnosis sheet designed to individualize the matrix to each golfer/patient.

[0020] Ultimately, the swing fault/correction matrix is to be utilized in electronic version so that once instructors select a fault, the possible causes and remedies are printed out in creative presentations, including practical information such as drills and exercises which can be done at home or under supervision of golf instructors and/or physical therapists.

BRIEF DESCRIPTION OF THE DRAWINGS

[0021] There are presently shown in the drawings embodiments which are presently preferred, it being understood,

however, that the invention is not limited to the precise arrangements and instrumentalities shown.

[0022] **FIG. 1** is a diagram of the operation of the Swing Fault-Correction Matrix;

[0023] **FIG. 2** is a chart of the Golf Professional Diagnostic Sheet utilizing the Swing Fault-Correction Matrix;

[0024] **FIG. 3** is a diagram of the Swing Fault-Correction Matrix having individual Matrix Components; and

[0025] **FIG. 4** is a diagram of the communication link between the golf instructor and physical therapist.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0026] The present invention relates to a method and apparatus for identifying and correcting golf swing deficiencies. More particularly, the present invention provides a swing fault/correction matrix method and apparatus which enables a careful analysis of the mechanical and physical causes for certain golf swing deficiencies. Additionally, the invention provides a combination of necessary rehabilitation procedures and exercises with specific golf drills to deliver unified improvement of golf technique in conjunction with physical improvements to the body. The present invention further provides a break down and analysis of specific components of one's golf swing in terms of both mechanical and physical causes and concurrently provides a training regimen wherein at least one of a golf professional and a physical therapist can monitor progress of the specific golfer. Although the illustrations provided herewith depict the present invention in specific embodiments, it is understood that the illustrations are intended to be for illustrative purposes only. Accordingly, it is understood that the invention can have several embodiments.

[0027] A method of correcting golf swing deficiencies utilizing a golf swing matrix apparatus includes the steps of characterizing a golf swing. The method further includes the step of processing any mechanical and physical deficiencies detected in the golf swing. Additionally, the method can include the step of providing at least one golf professional to analyze the data collected relating to the particular golf swing.

[0028] A swing fault-correction matrix facilitates the selection of the most appropriate stretches, golf drills, functional movements and progressive resistance exercises to correct swing flaw or mechanical deficiencies in one's swing. The swing fault-correction matrix is designed to provide the golfer with the most effective and efficient development and improvement of the physical and mechanical defects in the golfer's swing. The swing fault-correction matrix includes components such as, a golf pro analysis, a listing of mechanical causes and physical causes, stretches, functional exercises, machine exercises, free pulley exercises and golf drills designed to facilitate the golf training and specific rehabilitation of the golfer.

[0029] The swing fault-correction matrix provides an analysis of specific components of the golfer's swing which includes both a mechanical and physical analysis of the golf swing. Utilizing the golf pro analysis component, the major swing flaws can be identified along with any possible mechanical causes of the particular swing flaws. The major swing flaws can be identified by a golf professional or qualified golf program technician. The golf pro analysis component pinpoints focus areas, such as address posture, backswing, downswing and follow through. Address posture or address is the position of the body in relation to the ball prior to initiating the golf swing. Backswing is the process of moving the club head from the address position to the top of the arc of the swing. Downswing is the process of moving the club head from the top of the backswing toward impact. Follow-through is the portion of the swing from the moment of impact through the release and to the finish position. These critical focus areas are directly related to the creation of flaws in a golfer's swing. For instance, posture problems that can be easily identified utilizing the swing fault-correction matrix include problems with foot positioning and alignment, stance and grip pressure. These focus areas can be quickly identified using the golf pro analysis and subsequent corrections can be accomplished to provide significant improvements in the golfer's swing.

[0030] The golf pro analysis component of the swing fault-correction matrix can be further utilized to obtain specific bio-mechanical information related to the spinal movement and measuring movement of other body parts during the golfer's swing. Digital video imagery can be combined with other data concerning the golfer's swing to provide detailed analysis of the golfer's swing. Additionally, digital video imagery, along with motion capture technology, can be combined with matrix data to further quantify and objectify the golfer's swing and related deficiencies. Both, digital video imagery and motion capture technology can be supplied by different vendors. Thus, the golf pro analysis component provides a breakdown of the golfer's swing in a calibrated and synchronized format. The golf pro analysis component can operate utilizing sensors which track the movements of the golfer's swing. Sensors can be located on a sensor vest worn by the golfer while performing his swing. The sensors can be positioned near the hip of the golfer and aligned over the golfer's sacrum and waist. Additionally, sensors can be positioned along the spine of the golfer. Specific data for the particular golfer is based on physical characteristics of the golfer, such as weight and height, and utilized to accurately capture the golfer's swing from the point of takeaway, to the top of the backswing, to impact and follow through. The sensors can record hip and shoulder data, along with spine bending and correspondingly create a digital image of the golfer's swing. The sensors can also provide other relevant information directly related to the golfer's swing, such as information provided by data indicating weight transfer.

[0031] In an embodiment of the present invention, the golf pro analysis component of the invention can be utilized to provide measurable data related to target areas, such as shoulder rotation, hip rotation, spine angle side bending, spine bending, x-factor, weight transfer, hip side bending and hip/pelvic bending. These target areas are the key areas where adjustments can result in significant corrections in the golfer's swing. The data is used to correct the deficiencies in the particular area. Specific ranges can be provided for specific targets of the golfer using the golf analysis component. The preferable ranges in the target areas provide a basis to assist in the correction of the golfer's swing flaws utilized by the swing fault-correction matrix. Shoulder rotation data is provided in degrees with respect to the golfer's target line. The target line is the straight line between the ball and the intended target. For instance, shoulder rotation data can be used to identify the golfer's hand positioning while on the grip of the golf club, and address any corresponding deficiencies. Specifically, the shoulders are rotated closed approximately twice as much as the hips while at the top of the swing. Hip rotation data is provided in degrees with

respect to the target line. The hips should be squared, at zero degrees, to slightly open. At the top of the swing the hips should close at approximately forty five degrees. Spine Angle Side Bending Data is provided for the area relative upwards from the golfer's hip and pelvis in a lateral direction. The average spine bend at address is approximately five degrees to the right, having a range of two to eleven degrees. This angle should be maintained to the top of the swing. A reduction in the bend angle or a bend/lean towards the left for a right handed golfer might reflect limited rotational ability on the backswing and a resulting lift. Spine tilting data is also provided for the area relative upwards from the golfer's waist. Spine tilting at address depends on the height of the golfer. An increase in height corresponds to an increase in forward spine bend at address. The optimal range of the spine tilt should be between twelve and twenty four degrees and should be maintained through impact. The spine tilt angle is inversely proportional to the forward or backward tilt of the pelvis. For instance, as a golfer tucks his pelvis beneath him at address, the golfer will likely compensate by having a greater spine tilt to adequately approach the golf ball upon impact.

[0032] X-factor data is provided and measures the difference between shoulder rotation and hip rotation. The ratio of shoulder turn to hip turn at the top of the backswing should be preferably at a two to one ratio. However, it is more important that the X-factor reach its maximum value during the downswing. The ideal range is twenty four to fifty degrees. Weight transfer data measures the percentage of body weight on the right or rear foot at any time during swing. Generally, a golfer will place more body weight on his rear foot at address. Weight should be loaded between sixty eight and eighty five percent on the rear foot at the top of the swing and unload during the downswing. At the point of impact, approximately ten to thirty percent of the golfer's weight should remain on the rear foot and five percent at follow through. Pelvic Tilt data can be provided as a function of how far the golfer leans over his or her hips while in the address position and is essential in determining overall posture. A forward tilt between twelve and twenty one degrees is adequate and should be maintained to the top of the golf swing. Additionally, the forward downswing can be reduced slightly through the impact position. The golf pro analysis component assists in providing specific data related to critical areas concerning the golfer's swing and correspondingly provides corrective data to correct the particular deficiencies as suggested by the swing fault-correction matrix.

[0033] The golf pro analysis component provides information regarding the breakdown of the golfer's swing which can be utilized to further provide effective rehabilitation treatment for the golfer. The golfer can be evaluated by at least one of a golf professional and a physical therapist to provide both mechanical and physical analysis of the golfer's swing. Golf professionals performing an evaluation and analysis of the golfer's swing should have adequate knowledge of physical therapy procedures in order to properly evaluate the particular golfer's needs. Similarly, a physical therapist performing an evaluation should possess adequate golfing knowledge and the ability to effectively assist the particular golfer. Additionally, in certain situations it may be suitable to have a golf instructor and a physical therapist perform evaluations to deliver proper care to the golfer. The evaluation performed by the golf instructor can assist to identify the mechanical problems associated with the golfer's swing. Additionally, the swing fault-correction matrix provides a golf instructor having limited knowledge of the human body with critical information and illustrations to enable a proper diagnosis of the physical origins and limitations of the specific golf client's condition. The swing fault-correction matrix provides explanations and a treatment plan based on the diagnosis of the specific golfer or client.

[0034] The mechanical causes component can be identified by the swing fault-correction matrix and based on the information provided by the golf-pro analysis component and further developed by the golf instructor or physical therapist. Utilizing the swing fault-correction matrix can allow mechanical problems to be easily identified. For instance, the swing fault-correction matrix can identify mechanical problems associated with foot positioning, which can result from alignment and set up problems, inability to rotate backswing and follow through and ball positioning, as illustrated in **FIG. 3**. The physical causes component of the swing fault-correction matrix identifies the specific physical areas of the golfer's body that can be responsible for the golfer's deficiency in his swing and corresponding mechanical fault of the identified deficiency. Physical causes related to foot positioning can be caused by weak internal hip rotators, limited internal hip rotation, tight piriformis or a tight IT-band, as shown by the swing fault-correction matrix in **FIG. 3**. The information provided by the physical component of the swing fault-correction matrix concludes the initial analysis and allows the identified problem areas to be processed and the swing fault-correction matrix can provide further suggested remedies to the specific problems.

[0035] Varying types of treatment can be suggested by the swing fault-correction matrix depending on the particular mechanical and physical problems associated with the golfer's swing. The swing fault-correction matrix can provide suggested treatments that comprise a golf drill component, strength exercise component, stretches component and functional exercises component. The component areas suggested by the swing fault-correction matrix are specific to the individual swing flaws of the particular golfer. In a golfer having problems with foot positioning the swing fault-correction matrix can suggest a specialized treatment and rehabilitation program which includes specific exercises and drills to remedy the golfer's specific problems. For instance, the golf drill component of the swing fault-correction matrix can provide a golf drill called the "resisted single leg balance" to improve dynamic balance and lower body strength and stability that can assist in correcting problems associated with foot positioning. The strength exercise component of the swing fault-correction matrix can provide an exercise called the "swiss ball squat" to strengthen the gluteal and leg muscles and thereby improve foot positioning. The stretches component of the swing fault-correction matrix can provide an exercise called the "IT-Band Stretch" to increase IT-band and lateral flexibility, along with increasing hip turn, which can improve foot positioning. The functional exercises component of the swing fault-correction matrix can provide an exercise called the "Power Pivot" to strengthen the legs and hips to further provide an improvement in foot positioning. In most instances, a rehabilitative or improvement approach can comprise one or more golf drills, strength exercises, stretches and functional exercises.

[0036] The swing fault-correction matrix can be utilized through the use of a golf professional diagnostic sheet designed to individualize the matrix to each particular golfer, as depicted in **FIG. 2**. Additionally, the swing fault-

correction matrix can ultimately be utilized in an electronic version so that once a particular fault is determined, the possible causes and remedies can be printed out in a creative representation, including practical information related to drills and exercises which can be done at home or under supervision of a golf instructor or physical therapist. The present invention provides the public, i.e., known as clients, golfers, and patients, the ability to be evaluated by at least one of a golf instructor and a physical therapist. As depicted in **FIG. 4**, utilizing the present invention, a golf instructor having limited knowledge of the human body can have information concerning the human anatomy illustrated to him/her, which identifies the possible physical and mechanical causes of the golfer's swing deficiencies. Additionally, the present invention can provide a treatment regimen comprising protocol drills, exercises and stretches to remedy the identified swing deficiencies of the golfer. Similarly, a trainer, physical therapist or other individual having limited knowledge of the mechanics of golf can have technical information concerning golf provided to him/her to properly evaluate and assist the needs of the particular golfer. Utilizing the present invention, the golf instructor or other identified personnel having a sphere of expertise are provided with information to further allow a similar diagnosis to be reached for each golfer based on the golfer's swing deficiencies. The present invention also can serve as a solution to language barriers by providing the golf instructor with the knowledge base to communicate with a golfer using golf terminology and language understandable to the golfer. Additionally, the invention can provide an outline of the proper stretches and exercises to perform based on the particular swing deficiency called the "do's and don'ts". This aspect of the invention allows further diagnosis and prescription of a protocol for the golfer that is not detrimental to the golfer and only provides a benefit to the golfer based on the physical and mechanical aspects of the golfer's swing. For example, a golfer suffering from a hip replacement or having hip pathology will be prevented from engaging in exercises and stretches, such as the "hip internal rotation stretch", which may aggravate the golfer's particular condition. The swing fault-correction matrix can be utilized by at least one of a golf instructor and a physical therapist to singularly analyze a golfer based on the physical and mechanical causes of the particular golfer's swing deficiencies.

[0037] It will of course be understood that the invention is not limited to the specific details described herein, which are given by way of example only, and that various modifications and alterations are possible within the scope of the invention as defined therein. Those skilled in the art may make modifications that include variations in size, materials, shape, form, function and manner of operation, without departing from the principles and concepts set forth herein.

What is claimed is:

1. A swing fault-correction matrix apparatus comprising:

a means for characterizing a golf swing;

a processing means for analyzing mechanical deficiencies detected in said golf swing; and

a processing means for analyzing physical deficiencies detected in said golf swing.

2. The swing fault-correction matrix apparatus of claim 1, wherein said swing fault-correction matrix includes a motion capture means to quantify said mechanical deficiencies detected in said golf swing.

3. The swing fault-correction matrix apparatus of claim 1, wherein said swing fault-correction matrix includes a digital video imagery means for displaying trajectory of said golf swing.

4. The swing fault-correction matrix apparatus of claim 1, wherein said processing means records data selected from the group of shoulder rotation, hip rotation, spine angle bending, spine bending and weight transfer.

5. The swing fault-correction matrix apparatus of claim 3, wherein said weight transfer data measures the percentage of body weight throughout said golf swing.

6. The swing fault-correction matrix apparatus of claim 1, wherein said swing fault matrix can include a plurality of sensors to provide a digital imagery of hip rotation data collected throughout said golf swing.

7. The swing fault-correction matrix apparatus of claim 1, wherein said swing fault-correction matrix includes a golf drill component providing a plurality of golf drill exercises.

8. The swing fault-correction matrix apparatus of claim 1, wherein said swing fault-correction matrix includes a strength exercise component providing a plurality of strength drill exercises.

9. The swing fault-correction matrix apparatus of claim 1, wherein said swing fault-correction matrix includes a functional exercise component providing a plurality of functional exercises.

10. The swing fault-correction matrix apparatus of claim 1, wherein said swing fault-correction matrix includes a stretch exercise component providing a plurality of stretch exercises.

11. The swing fault-correction matrix apparatus of claim 1, wherein said swing fault-correction matrix includes a golf drill diagnostic sheet comprising a plurality of diagnostic information.

12. A method of correcting golf swing deficiencies, said method comprising the steps of:

providing swing characteristic data;

processing mechanical deficiencies detected in said trajectory of said golf swing;

processing physical deficiencies detected in said trajectory of said golf swing; and

providing at least one golf professional to analyze collected data of said golf swing.

13. The method according to claim 12, further including the step of completing at least one golf professional diagnostic sheet.

14. The method of claim 12, further including the step of providing a plurality of golf drill exercises for correcting identified deficiencies in said golf swing.

15. The method of claim 12, further including the step of providing a plurality of strength exercises for correcting identified deficiencies in said golf swing.

16. The method of claim 12, further including the step of providing a plurality of stretches for correcting identified deficiencies in said golf swing.

17. The method of claim 12, further including the step of providing a plurality of functional exercises for correcting identified deficiencies in said golf swing.

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