Notice Inviting e-Tender

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Supply and Commissioning of Medical equipments for setting up of Sports Medicine unit at IPGME&R and SSKM Hospital of the Govt. of West Bengal

(Submission of Bid through *online*)

Bid Reference No.: WBMSCL/NIT-383/2021 **Dated-25.11.2021**

Amendment-II

REVISED TECHNICAL SPECIFICATION

Schedule - I

ISOKINETIC SYSTEM

1. Multi-joint system for evaluation and rehabilitation of larger joints: Shoulder, Knee, Hip, Ankle, Elbow and Wrist. Attachments for these joints to be provided as standard.
2. Should have exercise modes: a) Isokinetic, b) Isotonic, c) Isometric, d) Passive, e)
3. Eccentric-Concentric mode
4. The system should have dedicated attachments for low height/pediatric population and should have dedicated hamstring attachment for H-Q Ratio Testing and training and Upper Extremity Neurological Attachments.
5. The motor should allow the dynamometer to act in response to the torque produced by the patient moving in a direction opposite to the applied torque permitting the muscle to perform eccentric exercises. Isotonic torque should be as low as 0.4 to 0.5 ft-lb.
6. A sophisticated control should allow the dynamometer to provide a continuous motion at a constant speed (passive mode) and to Simulate isotonic and the more original job specific work simulation activities with the help of dedicated

work simulation attachments i.e. Multiple Tool Adapters, Precision Pinch with Rotation, Spherical Grasp, and Lateral Pinch with Rotation, Three points. Prehension with Rotation, Upper Extremity Wheel, Upper Extremity Wrench, Speeder Wrench Simulator & Screwdriver Simulator & Prehension with Parallel Grip.

7. Should be compact system for multiple joints for the execution of closed kinetic chain exercises.
8. Should be used safely in both concentric and eccentric mode to evaluate, re-educate and train Muscles should be supplied with.
9. Should have dedicated (with these specialized attachments clinician can build on the research and initiate the power training on the system even with patient demonstrating impaired grasp due to hemiparesis)
10. The system should have Graphical User Interface with complete computer controlled operation and electronic range of motion control with soft stops for impact free control with display on the computer screen.
11. The system should be supplied with clinical data station of suitable configuration and should be on wheels so that the display can be moved in desired location for easy viewing by the patient and the therapist. And also include a software package with user definable report in formats, representing patient's status, progress and outcome over time, plot strength pain, ROM.
12. The system should have facilities for dynamic functional imaging to quantify the tests in colour codes via software also for overlay and comparison of data from different tests.
13. The system should have facilities for displaying exercise and test patterns on the computer screen.
14. Software should also include biofeedback facilities to track subject performance and motivate them during exercise.
15. The software should have the protocol for Multiple Angle Comparison Test and H/Q Ratio Test for Hamstring injury rehabilitation and prevention of reinjury using lengthened state eccentric training and incorporate database facilities with comparison to normative data.
16. Sampling rate of the software should be up to 1500 Hz to 2000 Hz using analog

signal interface.

17. Should be supplied with advanced software package to provide customized motor control, movement tracking and data analysis for use in advanced research. Should include analog signal access interface, separate roller trolley to keep the accessories.
18. The chair should be wide and should be electrical height adjustable and should have the possibility of forward / backward movement and back rest adjustment, the chair edge suitable to fill the gap created when the seat is flat. Makes the seat more comfortable for supine, prone or side lying exercises.
19. Dynamometer head should be gas spring controlled for height adjustment & should have facility to rotate & tilt.
20. Supplier should have minimum 4 installation of the same system in government setup supported with performance certificate not more than 3 months old In India.
21. The system should work on 220 V / 50 Hz.
22. Should be supplied with the suitable power stabilizer.
23. Should have international safety standards USFDA / European CE (4 digit European notified no).

Schedule - II

BODY WEIGHT SUPPORTED TREADMILL

1. The treadmill should be useful for adult and pediatric subject.
2. Should have Instrumented Walking Surface to provide the biofeedback to display a comparison of actual footfall to target gait parameter.
3. Should have windows CE operating system for enhanced software graphics audio and connectivity capabilities.
4. Treadmill should always stand at 0 mph with 0.1 mph speed increments.
5. Should have speed range of: Forward: 0 -16km/h.
    i) Reverse: 0-3 mph in 0.1 mph increments.
    ii) Gait training mode speed limited to 4.8km/h

6. Should have elevation range of 0 -15% grade and have exact-Track Belt to eliminate belt shift and tracking problems and a minimum of 2 HP modulation control power motor.
7. Walking Area should not be less than 160 x 50 cm.
8. Should have visual prompts to provide corrective action and positive reinforcement.
9. Footfall Targets should be normalised to limb length for accurate step cycle sequencing.
10. Should have Equate Belt Speed to match a patient's individual step cycle and display Total Time, Average Walking Speed, Total Distance and Steps, Average Step Length, Step Length Variability, Time of each foot.
11. Should have provision for providing normative data for comparison to healthy population on the basis of age and gender.
12. Should have facility for heart rate monitoring through contact hand grips and wide colour touch screen display of size minimum 10 inch and facility to store and print the test & training data.
13. Should be supplied with Printer and Printer Stand.
14. The unit should have dynamic suspension system to maintain consistent unweighing during walking or running.
15. The unit should have unique integral lift mechanism to assist patients from the seated position.
16. The unit should have an open frame design to accommodate all type of patients and to have an unobstructed forward view for the patients.
17. The unit should have display the readout quantifies unloaded weight.
18. The unit should have a hand held remote for height and Unweighing load adjustment.
19. The unit should have open unobstructed frame to allow clinician easy access to manually assist placement and timing of the lower extremities.
20. The unit should have large, easy roll locking casters removable arm supports. one system that can accommodate children to adults and provide approx, 60-68 kg unweighing capacity.
21. The unit should have a user capacity up to 150-170 kg and a vertical adjustment of 50 inch.

22. The unit should have auto unload feature to compensate for movement due to slippage or posture changes.
23. The unit should have choice of support vests accommodates all size patients and have universal support vest that accommodates chest sizes of 61 to 142 cm.
24. The unit should have international safety standards IEC 60601 -1; EMC to 60601-1-2.
25. Should have international safety standards USFDA /European CE(4 digit European notified no).

Schedule - III

BALANCE ANALYSER

The system should have following features:

1. Static and Dynamic balance system for assessment and fall conditioning.
2. High Resolution Color Touch-Screen LCD display size at least 15 inch based on windows operating systems with USB Port and Speakers.
3. Adjustable display height to accommodate each patients and supports USB keyboard in screens for entering text and numeric.
4. Visual Biofeedback in real time prompts patients into proper postural and balance control.
5. 6 to 15 Training Modes and Six Testing Modes for sports medicine/ orthopedics.
6. Interactive Game-Like Balance Training - increases patient interaction and compliance.
7. Standardized Fall Screening and Athlete Knee Injury Screening Tests - simple, quick and accurate.
8. Twelve Levels of Platform Control as well as Static Force settings - allows testing, training and rehabilitation programs for diverse populations.
9. Balance Training for proprioception and stabilization exercise range of motion and weight shift exercises.

10. Objective Documentation -printed color reports track progress and document outcomes.

11. Patient Data Storage maintains records to track progress and issue reports for lip to 1000 patients or above.

12. Locking Surface - ensures safe "on and off' patient movement.

13. Adjustable Support Handle- locks in place for safety or swings away for an unobstructed open environment allowing a variety of training activities.

14. The system should provides fast, accurate Fall Risk Assessment and Conditioning for older adults plus closed chain, weight-bearing assessment and training for lower extremity patients.

15. The system should be supplied with tactile based wireless vibration cueing sensor to sense the postural sway feedback for evaluation and treatment of vestibular disorders.

16. The system should help clinicians assess neuromuscular control by quantifying the ability to maintain dynamic bilateral and unilateral postural stability on a static or unstable surface by using any of four test protocols including fall risk, athletic single leg stability, limits of stability and postural stability.

17. The Balance System should also serves as a valuable training device to enhance kinesthetic abilities that may provide some degree of compensation for impaired proprioceptive reflex mechanisms following injury.

18. All test results and training sessions shouldy be documented on easy-to-read reports which can he placed into the patient's file. Comparisons to normative data can be made for population-specific tests using the Fall Screening and Athlete Single Leg Stability protocols.

19. Support Rails: Adjustable from 25" to 35" above platform (66 to 91 cm), can swing away from platform when not in use.

20. Platform tilt 15° and above from horizontal in all directions.

21. Should be supplied with suitable color printer with printer stand.

22. Patient Capacity: 150-180 kg

23. CE conformity to EN 60601-1.

24. European CE and US FDA approved.

25. Power supply :220V-240V/ SOHz

26. Should have international safety standards USFDA /European CE(4 digit European notified no).

Schedule – IV

SENS BALANCE MINI BOARD

1. The unit should be useful for Static & Dynamic assessment and measure force, force distribution & movements of the patient.
2. The equipment should be suitable for upper and lower extremities training therapy.
3. Should be useful for presentation and checking of the active exertion of force by the upper extremitities
4. Should be useful for performance of supporting activities, including with hemiplegia
5. Should be able to do presentation of weight distribution in bimanual supporting functional free sitting, symmetrical weight distribution and trunk and pelvis activities.
6. Should be able to check weight distribution during changing of position and during supporting leg phase and be useful for the improvement of active knee control, weight transferral, development of muscular strength and coordination of lower extremities & postural musculature.
7. Software should have the interactive therapy games for coordination and should generate the reports with progress diagram including all data.
8. The system should have feature of connecting through blue tooth to computer for wire free use of the unit for lower limbs/upper limbs/core muscles and the unit should be supplied with the suitable configuration of the desktop computer for the full operation of the system.
9. Should have international safety standards USFDA /European CE (4 digit European notified no).

Schedule – V

COMPLETE CARDIOPULMONARY STRESS TESTING IN METABOLIC CART

The system should be supplied with Tread Mill elevation and down-sloping facility.
The system should measure both children and adults, from patients to athletes; collecting full breath-by-breath data.

Parameters

1. $V'O_2$
2. $V'CO_2$
3. RER
4. $V'O_2$/kg
5. V'E
6. BF
7. VO_2 max (Directly measured)
8. EqO_2 (Calculated)
9. $EqCO_2$ (Calculated)
10. BR FEV% Breathing Reserve FEV1, FEV2
11. End tidal PO_2 (P_{ETO2}) (Directly measured)
12. End tidal PCO_2 (P_{ETCO2}) (Directly measured)
13. REE: FAT, CHO, PROT Fuel Ratio calculated from RQ
14. O2 and CO2analyzerswithcalibration.
15. Should have international safety standards USFDA / European CE (4 digit European notified no).

Schedule – VI

FINOMETER

Non-Invasive Blood Pressure System – Continuous finger blood pressure and cardiac output, stroke volume, and total peripheral resistance model flow estimates.

1. Wrist Unit and main Human NIBP Controller
2. Regular Cuff and Finger cuff.
3. Blood pressure accuracy: 1% of full scale (max. 3 mmHg)
4. Finger cuff pressure: 1% of full scale (max. 3 mmHg), Automatic zeroing, typically, 0.5 mmHg.
5. Height correction: 2% of full scale (max. 3 mmHg), Manual zeroing
6. Heart rate: (Rate (bpm) /60%), i.e., at 60 bpm, accuracy is ± 1%
7. Interbeat interval: 5ms (peak, non-accumulating).
8. Automatic tilt table should be provided with the system.
9. The system should provide deep breathing test.
10. The system should provide non invasive tonometer compatible with continuous bit to bit blood pressure.
11. Should have international safety standards USFDA /European CE(4 digit European notified no).

Schedule – VII

WHOLE BODY REACTION TIMER

1. Evaluation of the movement of the athlete's body in four directions in response to an abrupt appearance of optical stimuli on a special table.
2. Recording of the reaction time and duration of movement per direction.
3. Reaction test software: Evaluation of the simple reaction time to an optical or sound stimuli as well as discrimination and choice reaction time.
4. Continuous attention software: Evaluation of reaction time in a state of attention, and the number of right answers.
5. It can measure angles of shoulder, knee, trunk, hips, and elbow range of motion.
6. It should have load platform.
7. Camera for 3D analysis.
8. Should have international safety standards USFDA /European CE(4 digit European notified no).

Schedule – VIII

FOOT PRESSURE DISTRIBUTION MEASUREMENT SYSTEM

1. Should have platform system for analyzing: Gait, Foot function, Posture, Load Distribution, Equilibrium Feedback and Coordination training, static and dynamic force and pressure distribution under the feet/shoes.
2. Should have facility for comparative analyses: Barefoot - with shoes to evaluate influence of shoe and inlay sole on role-off behaviour and for calibration of all the sensors individually.
3. Should have Force measuring plate with 1000 or more capacitive force sensors arranged in a 32x47 cm matrix or more.
4. Should be USB based interface for connection with a standard PC or laptop.
5. Should have the sampling rate of 50-60 Hz in Dynamic mode, 25 Hz COP Mode, I-3 Hz static mode, depending from loaded area.
6. Should have force range of 1-120 N/cm^2 or more
7. Should have calibrated force range of 1-80 N/cm^2
8. Should have an accuracy of $\pm$ 5%.
9. Unit should have program software which runs under up to date windows operating system and 2D & 3D display of static & dynamic load distribution in left -right and back-front foot in percentage for direct comparison
10. The unit should have range of possibility of multi function measuring plate by load feedback and coordination training through use of games and have facility to show centre of gravity on the monitor screen as a function of time.
11. Should have international safety standards USFDA /European CE (4 digit European notified no).

Schedule – IX

SPEED, JUMP, TURN ANALYZER MACHINE

FUNCTIONAL EVALUATION OF GAIT KINEMATICS INVOLVED IN THE SPORT MEDICINE INCLUDING Speed, Jump, Turn analysis.

- Functional Assessment of athletes aiming at monitoring and improving their performances
- User friendly device to generate the report automatically and supply immediate comparison with normal range results
- System should have various types of test for gait analysis viz walking test timed up and turning test
- System should have various types of test for sports analysis viz. Squat Jump Squat with weight bar, Counter Movement jump Repeated CMJ, CMJ with arms thrust and Drop Jump
- System should display following spatiotemporal parameters speed cadence, step stride length gat cycle duration stance duration swing duration, single and double support phase duration
- System should display following Time of fight, Jump height, Maximum concentric strength Maximum eccentric strength, Minimum concentric power Maximum eccentric power, Concentric work, Eccentric work. Elasticity index, Bosco index Coordination index
- Systems use an inertial sensor connected to a computer via Bluetooth to determine spatio temporal parameter pelvic rotations and functional evaluation of kinematics involved in the sport movement
- System to be used around the waist by using an ergonomically designed belt System should have a analysis of speed, acceleration pattern and pelvic angles
- System should display the following pelvic griddle angle parameters vi anterior posterior rotations, ante-retroversion, lateral tilt
- The test result displayed in a complete analysis made of spatio-temporal parameters stride after stride, comparison between pre and post curve was patterns

- Should be supplied with complete software for the analysis of above spatio-temporal parameters, pelvic kinematics, functional evaluation of kinematics involved in the sport medicine
- Software should include normative data for all the acquired parameters.
- Other specification includes
    1. Sensor Typology: Tri axial accelerometer, Tri axial magnetometer, Tri-axial gyroscope
    2. Connectivity Bluetooth Frequency at least upto 175 Hz
    3. d Working real time
    4. d) Battery rechargeable via USB
    5. System should have international safety standards
    6. System should be upgradable in future through minimum 2 webcam for video recording
    7. Supplied with laptop with of suitable configuration and colour printer
- Lastly physical demonstration is required for technical evaluation.
- Should have international safety standards USFDA /European CE(4 digit European notified no).

Schedule – X

BICYCLE ERGO METER WITH CPET MEASUREMENT

1. Tidal volume (VT) (Directly measured)
2. Breathing frequency (BF) (Directly measured)
3. Inspired and expired oxygen concentrations (FIO_2, FEO_2) (Directly measured)
4. Inspired and expired CO_2 concentrations ($FICO_2$, $FECO_2$) (Directly measured)
5. Workload (Watt, respectively speed and elevation) (Directly measured)
6. Heart rate (HR, Stress and resting ECG) (Directly measured)
7. Oxygen saturation (SpO_2) with intregrated blood pressure (Directly measured)
8. Respiratory minute ventilation (V'E)
9. Oxygen uptake ($V'O_2$) (directly measured)
10. Carbon dioxide production ($V'CO_2$) (directly measured)
11. Respiratory Exchange Ratio (RER)
12. Oxygen pulse (O_2-Pulse)
13. Breathing equivalent (EqO_2, $EqCO_2$) calculated
14. Dead space ventilation (VD / VT) calculated
15. Breathing reserve (BR) calculated
16. Heart Rate Reserve (HRR) calculated
17. Ventilatory Threshold determination (VT1, VT2, VT3)
18. Maximum oxygen uptake ($V'O_2max$) (directly measured)
19. Slope determination
20. Aerobic capacity ($dV'O_2$ / dWR)
21. Ventilatory efficiency (V'E ($V'CO_2$) slope)
22. ECG: Display and data backup system with 1000 samples / sec and 12 channel wireless ECG with patient data management
23. Electronically Braked Leg Cycle Ergometers - Electrically control resistance on cycle independent of pedal frequency.
24. European CE (4 digit European Notified Number)/USFDA.
25. End Tidal PCO_2, End Tidal PO_2
26. Whole system should be same manufacture and same company
27. The System should be supported with 32 inches for single & atleast 20 inches and above for double monitor.

Schedule – XI

EXERCISE PHYSIOLOGY MEASUREMENT & ANALYSIS SYSTEM

Measure & analyze the physiological effects of exercise. To record and display continuous real-time measurements of metabolic parameters such as CO_2 and O2 concentrations, airflow, temperature of respired air, ECG or EMG.

Applications include:

1. Respiratory gas analysis
2. Pulmonary function analysis
3. Indirect calorimetry
4. Anaerobic threshold calculations
5. Temperature measurements
6. Bio Amp
7. Gas Analyzer
8. Gas Mixing Chamber
9. Spirometer
10. Thermistor Pod
11. Exercise Physiology Accessory Kit
12. Appropriate software platform that, includes the Metabolic Module for calculating metabolic parameters such as VCO_2, VO_2, respiratory exchange ratio (RER) and minute ventilationetc.
13. The system should be European CE (4 digit European Notified Number)/USFDA.

Schedule – XII

EMG BIOFEEDBACK IN REHABILITATION

1. Integrated vacuum unit for combination & electrotherapy plus cavity electrode
2. Adjustable audio signal
3. Stimulation and relaxation mode
4. Cavity electrode for incontinence
5. One channel pressure feedback in mmHg
6. Independent electrotherapy channels for rehabilitation, muscle strengthening, pain management.
7. Should be supplied with complete range of probes for EMG feedback and electro stimulation and pressure feedback (Anal or Vaginal) probes; surface electrodes for EMG feedback, rubber or adhesive electrodes for electric stimulation
8. Should have facility for treatment by setting objectives (viz. Sequential and conventional programs)
9. Should have free memory.
10. The system should be European CE (4 digit European Notified Number)/USFDA.

Note :- Documentation

a. User / Technical / Maintenance manuals to be supplied in English.

b. Certificate of calibration and inspection. List of equipment available for providing calibration and routine Preventive Maintenance support as per manufacturer.

Documentation in service / Technical manual.

c. List of important spare parts and accessories with their part number and costing. Log book with instructions for daily, weekly, monthly and quarterly maintenance checklist.

Schedule – XIII

MUSCULO SKELETAL USG

1. The USG machine should be a latest model of state of the art technology and stand alone unit along with colour Doppler facility and triplex imaging.
2. It should have frequency processing facility for THR transducer with the remote control facility. This must be offered with independently selectable gain control in lateral position
3. The USG machine should consist with 3 probes: i) Hockey Stick probe (6-19 MHz ±1) (ii). Linear probe (4-15 MHz ±1) (iii).ECHO probe (1-5 MHz ±1)
4. Linear probe should be coupled with biopsy attachment facility for MSK intervention.
5. System must be offered with acquisition frame rate of at least 1500 frames/sec or more.
6. System must be offered with cine loop review facility. Should be able to acquire and display upto 1500 frame or more 2D and color image for retrospective review and image selection.
7. Storage- should have direct connectivity to inject printer for printing image and reports.
8. Archive- should have facility transferred to integrated CD writer.
9. Full function measurement facility and calculation should be possible.
10. System must be offered with user friendly with high resolution user interface touch panel or intuitive keyboard.
11. System must be offered with tissue harmonic imaging.
12. Medical grade Monitor (size should be 21 inch or more).
13. Active port should be at least 4 in number.
14. Should have European CE (4 digit) and US FDA certificate

Schedule – XIV

Extremity MRI Machine

Sl.No	Specification OF Extremity MRI for department of Sports medicine
A	**Magnet**
1	It should be compact Open Permanent extremity in Office suite type for doing MSK Extremity MRI of hand knee and foot
2.	It should be light weight less than 2 tonne
3.	Field strength of atleast 0.31 tesla or more
4.	High resolution with minimal ambient noise
5.	Negligible fringe field to avoid interference with other equipments
6.	The magnet gantry features should have following features : -Self centering RF coil positioning system -Coil auto recognition -Optimizing image quality -LCD monitor on the magnet -Capability of efficient patient positioning.
B	**Operating features :**
7.	System should not consume more than 2 KVA electric power and should be plug and play
8.	MRI system should have inbuilt virtual private network capability
9.	System should have horizontal field orientation to perform MRI in sitting position
10.	System operation should be free of consumable gas
11.	System should be able to do on MRI on patients with casts and joint implants and avoid the magic angle artefacts on the ACL.
12.	It should have a built in software for contrast reuptake facility
13.	System should offer Gradient Strength of at least 15mT/m, Gradient Rise Time from-20mTto 20mT of the magnet should be less than 1 msec and Gradient Slew Rate of at least 40mT/m/ms
14.	MRI should be offered with Image display system with full features and user friendly interface. .
15	The office MRI equipment should be a one room installation inclusive of RF cage with magnet, console, operator, complete installation should be done in less than 12sqm.
C	**Coils:**
16.	The system should have following coils ; _Dual Phased Array RF Coils with integrated amplifiers. -Hand/Wrist Coil, Ankle Coil: -Knee Coil : with Dynamic MRI mechanism
17.	Sequences : The system should have the following Imaging Sequences : Pulse Sequences : Spin Echo(SE), Half Spin Echo (HSE), Half Fourier (HFE), Gradient Echo(GE), 2D Gradient Echo, Multiple Spin Echo(ME), Inversion Recovery(IR), STIR, STIR T2(for bone edema), Gradient Echo STIR (GESTIR), Turbo Spin

	Echo(TSE), Turbo Multiple Echo(TME), FSE STIRFSE(T1) FSE(T2)(Fat and Water separation), Turbo 3DT13D SHARC3D SST13DSST2.
18 D	**RF shielding:** The unit should have internal RF shielding design , dedicated RF room with with RF cage of atleast90 db.

E	It should have the **following accessories**
	Site Installation requisites to be taken care by the supplier
20	The following items, accessories & facilities will be installed or provided out alongwith Office MRI :- (a) Preparation of MRI Room (Suite) (i) **Floor**. Smoothening of floor and roof (ii) **Floor Cable Trenches**. Floor cable trenches with block board &/or wooden covers will be provided for the cables in the office MRI suite. (iii) **Walls**. The Walls will be plastered with cement and will be completely smoothened (iv) **Audio Call Bell System**. Audio call bell system with intercom at the entrance. (v) **Door & Window**. Door/window which should have adequate locking mechanisms. (vi) **Ceiling**. Waterproofing of the room is to be done for office MRI room (vii) **warning sign board** for patient entry in to magnetic room.
F	**ELECTRICAL SERVICES**
21.	(a) **UPS**. Atleast5 KVA UPS with 30 mins back up. (b) **Wiring & MCB**. Wiring (Copper), modular switches & sockets plugs MCBs etc are to be of reputed (c) **Dedicated isolated Copper Earthing**.Dedicated isolated Copper earthing is to be provided for the MRI equipment. (d) Electricity supply from the main board. (e) 2 Split AC of at least 1.5 ton tonne each (5 star energy rating)
H	**Post installation technical support and service**
22	Comprehensive Maintenance Contract equipment and all accessories for 5 years Facility for software up gradations free of cost during CMC period technical support within 24 hrs. During AMC period all breakdown must be attended with in 24 hrs of the complained registered **Down Time:** Maximum down time of the equipment should be 5% or less excluding holidays.
23.	The equipment should be CE (European 4 digit) or FDA approved.