

PROFESSIONAL BOARD FOR RADIOGRAPHY AND CLINICAL TECHNOLOGY

SCOPE OF PRACTICE: CLINICAL TECHNOLOGY

It is imperative to read the scope of practice in conjunction with the scope of profession for Clinical Technologists as defined in Booklet 2 Annexure10.

Clinical Technology is a dynamic healthcare profession that encompasses the use of technology as the core of the profession in diagnostic, therapeutic and organ support procedures.

The following procedures, which for the purposes of the application, are deemed to be actions which belong to the profession of clinical technology. Clinical Technologists upon qualification from an accredited University of Technology may after registration with the Health Professions Council of South Africa perform the following acts (as allowed by the specific registered category e.g. Private / supervised practice) and as defined below.

1. Application of apparatus for procedures:

- a. Ensure patient safety*
- b. Prepare and calibrate equipment for medical procedures*
- c. Perform general quality control procedures*
- d. Implements infection prevention and control*
- e. Prepare, educate / facilitate and instruct patients for procedures*
- f. Perform investigative, therapeutic or organ supportive procedures on patients*
- g. Assess and validate results*
- h. Collect and calculate test data in preparation for / and interpretation of reports*
- i. Calculate dosage for administration of certain medicines for related interventional procedures.*
- j. Calculate and provide the appropriate apparatus for procedures in collaboration with healthcare professionals*
- k. Oversee maintenance and functionality of equipment for associated procedures*

2. Because of the level of specialized skills required of a Clinical Technologist, their roles and responsibilities offer direct support and advice to other healthcare professionals in the maintenance and physiological management of patients in any outpatient setting, hospital and/or medical facility, intensive care units and theatre environment areas. A Clinical Technologist would therefore be required to:
 - a. *Advise / develop specifications of medical equipment and systems as well as software*
 - b. *Evaluate equipment for clinical physiological measurements and treatment*
 - c. *Select equipment/apparatus for clinical physiological measurements, treatment and/or organ support*
 - d. *Compile specifications for procurement of equipment*
 - e. *Evaluate and approve of selected equipment during the procurement process*
 - f. *Supervision of equipment control, safety and maintenance program and systems.*
3. Asses and monitor patients before during and after procedures
4. Acquire, store and administer emergency drugs for associated events and patient resuscitation
5. Perform basic and/or advanced life support procedures with automated external defibrillation.
6. Healthcare management applications/skills
7. Data capturing of interventional procedures performed and all supporting information
8. Training and student facilitation programs
9. Demonstrate and apply good communication skills and team co-operation

Cardiology:

Cardiology Technologists are responsible for the independent testing/investigation of non-invasive as well as invasive specialised procedures with the collaboration of a medical practitioner or to handle any cardiac related apparatus to obtain data to support or confirm diagnosis of specific cardiac disease.

The following procedures are performed according to standardised operating procedures:

1. Resting electrocardiogram (ECG).
2. Spirometry measurement.
3. Anthropometric measurement.
4. Coagulation studies.
5. Respiratory rate measurement.
6. Non-invasive blood pressure measurement.
7. Oral and axillary temperature measurement.
8. Radial and femoral pulse measurement.
9. Blood gas testing.
10. Oximetry.

11. Non-provocative nebulisers.
12. Oxygen therapy (mask and nasal cannula).
13. Setting up of pressure transducers and infusion devices.
14. Phlebotomy.
15. Exercise Stress Test.
16. 24hr/48hr Ambulatory Blood Pressure Monitor.
17. 24hr/48hr Holter ECG Monitor.
18. Cardiac catheterisation procedures and related studies
19. Ablation procedures
20. 3 D Mapping
21. Electro Physiology Studies.
22. Assist during the implantation of Temporary and Permanent Pacemakers.
23. Cardioversion; Defibrillation.
24. Echocardiography, (including Trans Oesophageal, dopamine stress and inter cardiac-echo)
25. Intravascular ultrasound, imaging and interventional procedures
26. Setup, operation and Troubleshooting of IVUS and Rotablation
27. Assistant with Mechanochemical ablation of veins
28. Radiofrequency ablation of varicose veins.
29. Venous Mapping for Stripping
30. Venous mapping of Great Saphenous Vein for surgery bypass (vein harvesting)
31. Assistant with Ultrasound for dialysis permanent Catheter insertion
32. Assistance with Ultrasound for AVF creation for dialysis patients
33. Ultrasound guided line insertion
34. Assist during physiology-guided revascularisation procedures
35. Testing/Programming of Permanent Pacemakers - Dual, Biventricular, ICD, Loop Devices, Trans -Telephonic Diagnostic Checks.
36. Permanent Pacemaker Selections.
37. Intra -Aortic Balloon Pump.
38. Left Ventricular Assist Therapy.
39. External counter pulsation
40. Rotablation
41. Percutaneous transvenous mitral commissurotomy (PTMC)
42. Congenital heart disease interventions

Cardiovascular Perfusion:

Cardiovascular perfusionists are responsible for the usage of extracorporeal apparatus in any situation where it is necessary to temporarily support or take over the patients circulatory and respiratory function. They handle and manage all blood management devices and organ support apparatus for specific surgical interventions to any organ related procedure.

The following procedures are performed according to standardized operating procedures:

1. Resting electrocardiogram.
2. Anthropometric measurement.
3. Coagulation studies.
4. Respiratory rate measurement.
5. Non-invasive blood pressure measurement.
6. Oral and axillary temperature measurement.
7. Radial and femoral pulse measurement.
8. Blood gas sampling, measurement, interpretation and intervention.
9. Oximetry.
10. Non-provocative nebulisers.
11. Oxygen therapy (mask and nasal cannula).
12. Nitrous Oxide Therapy
13. Carbon Dioxide Removal Therapy
14. Capnography
15. Setting up of pressure transducers, cardiac output devices, infusion devices.
16. Phlebotomy.
17. Intra-Aortic balloon pump.
18. Autologous blood recovery and blood management (Cell saving).
19. Cardiovascular and haemodynamic monitoring.
20. Cardioversion & Defibrillation.
21. Cardiopulmonary bypass procedures for cardiac and non-cardiac procedures
22. Extracorporeal membrane oxygenation for cardiac and/or pulmonary procedures
23. Left and right ventricle assist therapy.
24. Haemoconcentration
25. Modified Ultrafiltration
26. Drug Administration and management of side effects.
27. External Counter pulsation
28. Temporary pacemaker preparation and operation
29. Administration of blood and blood products
30. Plasmapheresis
31. Ablation and Maze
32. Transport of critically ill patients
33. Selective organ perfusion
34. Isolated limb perfusion
35. Cerebral perfusion and Monitoring
36. Assistance with Organ Harvesting
37. Harvested Organ Preservation
38. Extracorporeal Membrane Oxygenation Assisted Cardiopulmonary Resuscitation (ECPR)
39. Cerebral Saturation Monitoring
40. Haemoconcentration
41. Intra operative online haemodynamic parameter monitoring

Critical Care:

Critical Care technologist support medical professionals in the handling, management, and application of life support equipment on patients in different critical care procedures in the areas related to operating theatre, recovery rooms, specialised medical facilities, casualties and intensive care units.

The following procedures are performed according to standardized operating procedures:

1. Resting electrocardiogram.
2. Spirometry measurement.
3. Anthropometric measurement.
4. Coagulation studies.
5. Respiratory rate measurement.
6. Non-invasive blood pressure measurement.
7. Oral and axillary temperature measurement.
8. Radial and femoral pulse measurement.
9. Blood gas sampling, analysis, and interventional therapy.
10. Oximetry.
11. Capnography.
12. Non-provocative nebulisers.
13. Oxygen therapy (mask and nasal cannula).
14. Setting up of pressure transducers, ventilators, respiratory support and infusion devices.
15. Phlebotomy.
16. Invasive haemodynamic monitoring procedures.
17. Set up equipment for intrahospital transportation of critically ill patients, invasive and non-invasive haemodynamic monitoring, monitoring of an anesthetized patient.
18. Setting up and monitoring of intracranial pressure
19. Preparation of ICU drugs.
20. Assists with bronchoscopy and right heart catheterization.
21. Intubation, intravenous cannulation, emergency drug therapy.
22. Intra-Aortic Balloon Pump.
23. Ventilation and respiratory support therapy, monitoring and resuscitation.
24. Perform acute haemodialysis and continuous renal replacement therapy.
25. Determine blood flow (Doppler).
26. Autologous blood recovery and blood management (Cell saving)
27. Extra-corporal membrane oxygenation (ECHMO) & ECCOR
28. Metabolic studies.
29. Left ventricle assist therapy.
30. Cardioversion, defibrillation / transcutaneous pacing.
31. Electrolyte determination and management.
32. Coagulation studies.
33. Endoscopy.
34. Ultrasonography (including vascular and neonatal brain ultrasound).
35. Vascular laboratory procedures (including rotablation and ablation of varicose veins
36. Vascular Room Procedures and/or Operating Theatre

37. Patient preparation, Setup and Monitoring of ECG, NIBP, Invasive Pressure and emergency equipment.
38. Setup, operation and Troubleshooting of IVUS and Rotablation
39. Assistant with Mechanochemical ablation of veins
40. Radiofrequency ablation of varicose veins.
41. Venous Mapping for Stripping
42. Venous mapping of Great Saphenous Vein for surgery bypass (vein harvesting)
43. Assistant with Ultrasound for dialysis permanent Catheter insertion
44. Assistance with Ultrasound for AVF creation for dialysis patients
45. Ultrasound guided line insertion
46. Assist with ICU/Trauma/Theatre clinical procedures.
47. Physiological data management.
48. Advanced patient transport.
49. Therapeutic Hypothermia.
50. Assist with anaesthesia
51. Neurological Monitoring in the acute setting (AEEG)

Nephrology:

The performance of extra-corporeal procedures in the field of nephrology, as well as apheresis with the appropriate apparatus.

Collaboration with medical practitioners in the use of medical apparatus for blood management and patient monitoring.

The following procedures are performed according to standardized operating procedures:

1. Resting electrocardiogram
2. Peak flow measurement.
3. Anthropometric measurement.
4. Anticoagulation testing and monitoring
5. Respiratory rate measurement.
6. Non-invasive blood pressure measurement.
7. Oral and axillary temperature measurement.
8. Radial and femoral pulse measurement.
9. Blood gas testing.
10. Point of care pathology testing
11. Non-invasive oximetry & capnography.
12. Non-provocative nebulisers.
13. Oxygen therapy (mask and nasal cannula).
14. Intravenous cannulation.
15. Phlebotomy.
16. Chronic and acute haemodialysis.
17. Peritoneal dialysis.
18. Administer blood transfusion.
19. Exchange transfusions.
20. Paediatric dialysis.
21. Apheresis.
22. Adsorption therapy
23. Liver dialysis

24. Membrane Plasma Separation
25. Hemoperfusion
26. Hemofiltration
27. hemodiafiltration
28. Expanded haemodialysis
29. Slow continuous ultrafiltration (SCUF)
30. Continuous renal replacement therapy
31. Cell Saving
32. Stem Cell Harvesting.
33. Reuse of dialysers (automated and manual).
34. Water analysis, testing, disinfection and quality control.
35. Drug administration and management of side effects.
36. Slow low efficiency dialysis (SLED).
37. Vascular access management
38. Pre-end stage kidney disease management
39. Palliative care in end stage kidney disease
40. Aspiration & sterile techniques of arteriovenous (AV) lumens and infusion techniques of AV and venous lumens
41. Intramuscular & subcutaneous injections as prescribed
42. Suture and removal of temporary catheters

Neurophysiology:

Neuro Physiology Technologists are responsible for the independent performance of electro physiological and associated special procedures as well as tests of the brain, nervous and muscular systems of patients to obtain supportive evidence of underlying neurology related diseases and conditions.

The following procedures are performed according to standardized operating procedures:

1. Resting electrocardiogram.
2. Anthropometric measurement.
3. Coagulation studies.
4. Respiratory rate measurement.
5. Non-invasive blood pressure measurement.
6. Oral axillary and skin temperature measurement.
7. Radial and femoral pulse measurement.
8. Blood gas testing.
9. Non-invasive oximetry.
10. Oxygen therapy (mask and nasal cannula).
11. Setting up of pressure transducers and infusion devices.
12. Electroencephalography (EEG).
13. Multiple sleep latency test (MSLT).
14. Polysomnography and sleep apnea screening
15. CPAP/BiPAP titrations.
16. Nerve conduction studies (NCS).
17. Electromyography (EMG).
18. Transcranial dopplers (TCD) and ultrasonography with colour duplex doppler (TCCDD).

19. Transcranial magnetic stimulation
20. Peripheral nerve and muscle ultrasonography
21. Evoked potentials (EP).
22. Electronystagmography (ENG)
23. Long-term epilepsy monitoring video studies (LTEM).
24. Brain mapping.
25. Subdural monitoring.
26. Intra-operative neuro-monitoring
27. Drug Administration and management of side effects.
28. Brain death assessment an evaluation

Pulmonology:

Pulmonology Technologists are responsible for the performance of special procedures directly on patients with the help of electronic and computerised equipment to support and confirm diagnosis of respiratory disease as well as corrective procedures in the Respiratory Intensive Care unit and related respiratory facilities.

The following procedures are performed according to standardized operating procedures:

1. Resting electrocardiogram.
2. Spirometry measurement.
3. Anthropometric measurement.
4. Coagulation studies.
5. Respiratory rate measurement.
6. Non-invasive blood pressure measurement.
7. Oral and axillary temperature measurement.
8. Radial and femoral pulse measurement.
9. Blood gas sampling, measurement and interpretation.
10. Oximetry.
11. Capnography
12. Non-provocative nebulisers.
13. Oxygen therapy (mask and nasal cannula).
14. Setting up of pressure transducers, ventilators, infusion devices.
15. Phlebotomy.
16. Maximum Inspiratory and Maximum Expiratory Pressure measurement.
17. Vital signs monitoring.
18. Assist with bronchoscopy procedure.
19. Plethysmography.
20. Lung diffusion measurement.
21. Provocation Studies (eg. Histamine, exercise).
22. Polysomnography (neurological and respiratory).
23. CPAP and BiPAP titration studies
24. Lung compliance, Exercise (VO₂ max), Shunt, and Endurance studies.
25. Drug Administration and management of side effects.
26. Allergy testing (Skin prick testing/RAST studies)
27. Nitric oxide studies

Reproductive Biology:

Reproductive biology technologists handle equipment related to all reproductive organ procedures, pre and post -surgical intervention in theatre as well as diagnostic and investigative actions in laboratories.

The following procedures are performed according to standardized operating procedures:

1. Resting electrocardiogram.
2. Anthropometric measurement.
3. Coagulation studies.
4. Respiratory rate measurement.
5. Non-invasive blood pressure measurement.
6. Oral and axillary temperature measurement.
7. Radial and femoral pulse measurement.
8. Non-invasive oximetry.
9. Non-provocative nebulisers.
10. Oxygen therapy (mask and nasal cannula).
11. Phlebotomy.
12. Collection of semen/sperm samples from and through various sources and methods (inter alia MESA/TESA).
13. Performance of standard and advanced semen analyses.
14. Cervical mucus collection and examination.
15. Spermatozoa (Semen) -cervical mucus interaction tests.
16. Immunological (male/female sperm antibody) tests - basic and advanced.
17. Advanced semen/spermatozoa preparation/separation methods.
18. Preparation of media (including blood).
19. Identification and evaluation of ova/embryos.
20. Insemination and transfer of ova/embryos in the laboratory.
21. Embryo transfers in patients.
22. Cryopreservation/vitrification of semen, ova and embryos.
23. Artificial insemination (sperm preparation and transfer).
24. Experimental animal work.
25. Advanced micromanipulation procedures (ICSI/cell biopsies/assisted hatching).
26. Drug Administration and management of side effects.
27. Donor specimens (oocytes and semen) admin, handling, processing and storage.
28. In Vitro maturation of oocytes
29. Chromosome identification through pre genetic testing (PGT) and or fluorescence in situ hybridization (FISH)
30. Patient counselling before and after assisted reproductive techniques (ART).
31. Patient counselling in Donor semen and oocyte cycles
32. Advanced and routine Semen Analysis
33. Embryo biopsy and testing
34. Assisted hatching

Annexure A

Emergency Drug storage and drug administration by Clinical Technologists

Class	Substance	Indication	Schedule
Anti-arrhythmic	Adenosine / Adenocor		S4
Adrenergic	Adrenaline / Epinephrine		S4
Anti-arrythmia	Amiodarone		S4
	Antihistamine		S5
Anti-Cholinergic	Atropine		S4
	Calcium chloride 10%		S3
	Calcium gluconate 10%		
Platelet aggregation inhibitor	Clopidogrel		S3
Carbohydrate	Dextrose		S3
Benzodiazepine derivative	Diazepam		S5
High ceiling loop diuretic	Furosemide		S3
Hyperglycaemic agent	Glucagon		S4
Antithrombotic agent	Heparin sodium		S4
Corticosteroids	Hydrocortisone		S4
Plasma substitutes and colloid solutions	Hydroxyethyl Starch		S3
Induction agent	Ketamine		S5
Anti-arrythmia	Lignocaine hydrochloride (Systemic)		S4
Benzodiazepine derivative	Lorazepam		S5
Mineral supplement	Magnesium		
Opioid Antagonist	Naloxone hydrochloride		S4

Vasodilator	Nitro-glycerine (spray / sublingual / oral / IV)		S3
Non-Selective Antihistamine	Promethazine		S5
Mineral and electrolyte	Potassium chloride		S3
Muscle Relaxants (Neuro blocking agents)	Rocuronium		S4
Selective B2 Agonists	Salbutamol		S3
	Sodium bicarbonate 8.4%		
Plasma substitutes and colloid solutions	Sodium chloride		S3
Cardiology			
Non ionic contrasts	Ominopaque, isovue	Used in the assistance and preparation during cardiac catheterization	
Thrombolytics	Alteplase (Activase)	Used in the assistance and preparation during cardiac catheterization	S4
Anticoagulant	Sodium Heparin	Preparation of transducers for monitoring and intra-aortic balloon pump	S4
Critical care			
Thrombolytics	Alteplase (Activase)	Used in the assistance and preparation during cardiac catheterization	S4
Benzodiazepine	Dormicum	Preparation for Sedation	S5
Muscle relaxant	Rocuronium	Preparation for Anesthesia	S6
Anticoagulant	Heparin	Application of transducers and cell saving	S4
Local Anaesthetic	Lignocaine	Used prior to insertion of peripheral line	S4
Opioid/pain	Fentanyl	Used in preparation for anesthetic	S7

Adrenergic	Ephidrine	Prep for anesthetic	S5
Inhalant Anaesthetics	Sevoforane, Desforane	For anesthetic machine	S5
Anticholinergic/antimuscarinic	Atropine	Reversal agent	
Lipophilic general aesthetic	Diprivan/propofol	Preparation of anesthesia- CNS depression	S6
Cardiovascular Perfusion			
Anticoagulation	Heparin Sodium	Coating the bypass circuit and maintain anticoagulation during bypass procedure, transducers and cell saver	S4
Adrenergic	Phenylephrine	Maintaining haemodynamics during cardiac surgery	S6
Muscle Relaxants	Rocuronium	Maintain patients in a depressed state during cardiac surgery	S4
Inhalant Anaesthetics	Isoflurane Sevoflurane	Maintain anesthesia and neural preservation	S5
Anti- Arrhythmic	Remicaine		S4
Diuretics	Furosemide	Ensure kidney function	S5
Osmotic Diuretic	Mannitol	Ensure kidney function and eliminate free radicals	S3
Ions/Electrolyte replenisher	Potassium Sulphate Magnesium sulphate	Treat hypokalemia during cardiac surgery Treat cardiac arrhythmias during cardiac surgery	S5 S3
Isotonic Solution	Cardioplegia	For initiating cardiac arrest for bypass surgery	S3
Nephrology			
Anticoagulation	Citrate Anti coagulation	Anticoagulation and catheter locking agent	S4
ACE inhibitor	Enalapril	Hypertensive crisis	

Dialysate	Dialysate	Dialysate used in renal replacement therapies	S3
Antithrombotic agent	Enoxaparin	Anticoagulant	S4
Antithrombotic agent	Heparin Sodium	Anticoagulant	S4
Supplement	Iron	Replacement of iron	S3
Stimulate	Erythropoietin	Increase Red blood cells	S2
Anti-Emetic	Metoclopramide monohydrochloride	Propulsive ant emmetic/dopamine antagonist	S4
Antidote	Protamine Sulphate	Reverse anticoagulation effects of heparin	S4
Thrombolytic agents	Streptokinase	Enzyme	S4
Vaccination	Hepatitis and Influenza Vaccination	Prophylaxis	S4
Neurophysiology			
Benzodiazepines	Lorazepam	Termination of seizures	S5
	Diazepam	Termination of seizures	S5
	Midazolam	Termination of seizures	S5
Local anaesthesia	Lignocaine	Local anaesthesia for painful procedures	S4
Anticonvulsants	Sodium Valproate	Acute seizures	S4
	Phenytoin	Acute seizures	S3
	Phenobarbital	Acute seizures	S5
Sedatives	Chloral Hydrate	Sedation for EEG/other procedures	S6
	Vallergan Forte	Sedation for EEG/other procedures	S5
Local anaesthetic	Lignocaine/macaine	Preparation during IVF and post IVF	S4
Anxiolytic	Dormicum	Muscle relaxant	S5
Narcotic Analgesia	Pethidine	Pain management during IVF	S5
Analgesic	Paracetamol(perfalgan IV)	Pain management	S3
Insulin	Rapid acting insulin	Potassium shift	S3

Hormonal drugs			
Recumbinant FSH/LH	Pergoveris	Fertility treatment and management	S4
Urinary FSH/LH	Fostimon	Fertility treatment and management	S4
HMG	Menopur		S4
Luteal Phase Support	Crenon Uterogesterone		S4
GnRH antagonists and agonists	Cetratide Lucrine		S4
Human Chorionic Gonadotropin (HcG)	Ovitrell	Suppress the body's own natural immune response	S4
Intralipid			S4
Sperm Multivitamins	Staminagrow, Ferelox	Improve and support reproductive health	sublimit
Female fertility Multivitamins	Staminagrow, Fertipil plus	Improve and support reproductive health	Sublimit

Document compiled by:

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Health Professions Council of South Africa

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