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Table S1: The taxonomy of evidence-based Medical eXtended Reality (MXR) applications, 2020-2023; further updates from 2023-current in MXR App database. Video explanation link: https://oss.sciexplor.com/images/web/2025-01-24/ec2024109.mp4

No.	Evidence-Based MXR Taxonomy (Technology, Purpose, End-User)
1	**PREVENTION**
1.1	***VR Mental Wellness Experiences for General Users***
1.1.1	360° Videos for Relaxation and Mental Wellness Guided Relaxation for Patients and Practitioners Seeking Relaxation
1.1.2	VR Therapeutic Social Prescribing Experiences for Patients Referred by Healthcare Providers
1.1.3	360° Video-Based VR for Emotional Well-being Using Nature-Karaoke Singalong for Individuals Desiring Emotional Uplift
1.2	***VR Fitness Platforms***
1.2.1	VR for Immersive Exercise Combining Music and Movement for Health Enthusiasts Seeking Engaging Workouts
1.2.2	VR for Full-Body Engagement in Exercise for Fitness Enthusiasts Wanting Immersive Experiences
1.2.3	VR for Gamified Strength Training Using Real Resistance Machines for Individuals Seeking Gamified Workouts
1.2.4	VR for Home Exercise Offering Various Classes and Workouts for Individuals Looking for Convenient Workouts
1.2.5	XR for Fitness Training Motivation Using Gamification for Physically or Intellectually Disabled Individuals
1.3	***VR Meditation and Mindfulness Platforms***
1.3.1	VR for Personalized Meditation Journeys for Individuals Seeking Mindfulness and Relaxation
1.3.2	VR for Deep Relaxation Using Psychedelic Visuals and Music for Individuals Desiring Immersive Meditation Experiences
1.3.3	VR for Self-Exploration Using Interactive Sound and Visual Meditation for Individuals Interested in Meditative Self-Exploration
1.3.4	VR for Anxiety Reduction Using Therapeutic Deep Breathing Game for Individuals Experiencing Stress or Anxiety
1.3.5	VR for Mindfulness Practice in Nature Environments for Individuals Practicing Mindfulness
1.3.6	XR for Stress Management Using Neurofeedback and Biofeedback for Individuals Seeking Stress Reduction Techniques
1.4	***VR Smoking Cessation Programs***
1.4.1	VR for Smoking Cessation Using Behavioral Therapy Techniques for Individuals Aiming to Quit Smoking
1.5	***VR Molecular Visualization Platforms***
1.5.1	VR for Collaborative Drug Discovery and Molecular Research for Scientists and Researchers
1.6	***VR Mental Wellness and Therapeutic Experiences***
1.6.1	360° VR for Relaxation Using Immersive Environments and Guided Meditations for Individuals Seeking Relaxation
1.7	***VR Patient Education Platforms***
1.7.1	VR Interactive Simulations to Explain Medical Procedures for Patients Needing Understanding of Treatments
1.7.2	VR for Health Education Providing Immersive Experiences to Understand Conditions for Patients and Caregivers
1.8	***XR Education and Training Platforms for Medical Students and Practitioners***
1.8.1	XR Education Platforms for Medical Students

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No.	Evidence-Based MXR Taxonomy (Technology, Purpose, End-User)
1.8.1.1	VR for Interactive Anatomy Lessons for Medical Students Learning Anatomy
1.8.1.2	AR for Detailed 3D Models in Human Anatomy Learning for Medical Students Studying Anatomy
1.8.1.3	VR for Custom VR Lessons Using Educational Content Creation for Educators Developing VR Content
1.8.1.4	VR for Interactive Simulations in Medical Education and Training for Medical Students and Educators
1.8.1.5	AR/VR for Detailed Anatomical Models in Human Body Visualization for Medical Students and Educators
1.8.1.6	VR for Simulating Hospital Environments in Medical Education for Medical Students Preparing for Clinical Settings
1.8.2	XR Training Platforms for Medical Practitioners and Trainees
1.8.2.1	VR for Surgical Training Allowing Practice at Home for Medical Trainees Practicing Surgical Skills
1.8.2.2	VR for Virtual Dissection Experiences in Cadaver Dissection for Medical Trainees Needing Practice
1.8.2.3	VR for Realistic Surgical Training with Haptic Feedback for Medical Trainees Requiring Tactile Feedback
2	**DIAGNOSTICS and PRE-TREATMENT PLANNING**
2.1	***AR Surgical Visualization and Navigation Systems for Surgeons***
2.1.1	AR for Enhanced Navigation Using Preoperative Imaging for Surgeons Requiring Real-Time Anatomical Guidance
2.1.2	AR for 3D Holographic Guidance During Procedures for Surgeons Seeking Augmented Reality Assistance
2.1.3	AR for Intraoperative Use Integrating CT and MRI Data for Surgeons Needing Integrated Imaging
2.1.4	AR for Hip Replacement Surgery Guidance for Orthopedic Surgeons Performing Hip Surgeries
2.1.5	AR for Precision in Spine Surgery Navigation Using Machine Vision and AI for Spine Surgeons
2.1.6	AR Headset for Real-Time Visualization of Patient Data for Surgeons Desiring Immediate Data Visualization
2.1.7	AR for Enhanced Anatomy Visualization During Surgery for Surgeons Needing Enhanced Views
2.1.8	MR for Integrated Imaging Solutions in Surgical Navigation for Surgeons Seeking Comprehensive Imaging
2.2	***VR Eye-Tracking and Assessment Tools***
2.2.1	VR for Brain Assessment Using Eye-Tracking for Clinicians Assessing Patient Brain Function
2.2.2	VR Headset with Eye Control for Immersive Experiences for VR Users Requiring Eye-Tracking Capabilities
2.3	***XR Volumetric and 3D Medical Imaging Platforms***
2.3.1	Volumetric 3D for Surgical Planning in Medical Imaging Visualization for Surgeons Planning Complex Procedures
2.3.2	Holographic Imaging for Real-Time 3D Visualization in Cardiology for Cardiologists Requiring Detailed Heart Imaging
2.3.3	3D Medical Imaging Software for Patient-Specific Modelling for Medical Professionals
2.3.4	3D Viewer for Interactive Visualization in Medical Imaging for Clinicians Reviewing Complex Data
2.4	***XR Surgical Imaging and Planning Tools for Surgeons***
2.4.1	VR for Surgical Imaging and Planning with Patient-Specific 3D Models for Surgeons Requiring Immersive Planning
2.4.2	AR for Surgical Navigation Integrating Real-Time Imaging for Surgeons Needing Augmented Reality Guidance
2.4.3	VR for Preoperative Planning in Surgical Visualization for Surgeons Preparing for Neurosurgical Procedures
2.5	***AR Medical Imaging Devices***

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No.	Evidence-Based MXR Taxonomy (Technology, Purpose, End-User)
2.5.1	AR for Advanced Imaging Solutions in Medical Imaging Devices for Radiologists and Technicians
2.5.2	AR for Enhanced Imaging in Computed Tomography Solutions for Clinicians Requiring Advanced CT Imaging
2.5.3	AR for Improved Venipuncture in Vein Visualization Devices for Nurses and Phlebotomists
2.6	***XR Digital Twin and Anatomical Education Platforms***
2.6.1	Digital Twin for Personalized Medicine and Simulation for Clinicians and Researchers Developing Patient-Specific Treatments
2.6.2	Virtual Twin of the Human Heart for Research and Surgical Planning for Cardiologists and Researchers
2.6.3	AR for Interactive 3D Models in Anatomical Education for Medical Students and Educators
2.6.4	AR/VR for Detailed Anatomy in Human Body Visualization for Medical Professionals Requiring In-Depth Models
2.7	***AR Neuro-Marketing and Assessment Tools***
2.7.1	AR for Neuro-Marketing Using Neuroscience for Researchers in Consumer Behavior Studies
2.7.2	VR for Attention Assessment in Evaluating ADHD Symptoms for Clinicians Assessing Attention Disorders
2.8	***XR Diagnostic Tools***
2.8.1	VR for Early Detection of Alzheimer's Disease Using Navigation Tests for Clinicians Diagnosing Early-Stage Alzheimer's
2.8.2	Holographic Therapy Guidance for Cardiac Procedures for Cardiologists Performing Interventions
2.9	***XR Diagnostics for Concussions and Head Trauma***
2.9.1	VR for Concussion Evaluation Using Eye-Tracking Brain Assessment for Clinicians Assessing Head Injuries
2.10	***XR Telehealth Examination Devices***
2.10.1	Telehealth Device for Remote Patient Monitoring for Patients Requiring Remote Consultations
2.10.2	Telehealth Device for Professional Use in Examinations for Healthcare Professionals Conducting Remote Exams
2.10.3	Telehealth Device for Clinical Settings in Examinations for Clinics Implementing Telehealth Services
3	**TREATMENT and INTRA-OPERATIVE ASSESSMENTS**
3.1	***XR Pain and Anxiety Management***
3.1.1	XR for Acute Pain Management
3.1.1.1	VR for Pain Management for Pediatric Patients Undergoing Medical Procedures
3.1.1.2	VR for Alternative Pain Management for Patients Requiring Non-Pharmacological Analgesics
3.1.1.4	VR for Pain Management During Dressing Changes for Burn Victims
3.1.1.5	VR for Pain Management During Medical Procedures for Patients Undergoing Stressful Procedures
3.1.2	XR for Chronic Pain Management
3.1.2.1	VR for Extended Pain Distraction Using Virtual Snow Environment for Burn Victims
3.1.2.2	VR for Pain Relief for Patients with Chronic Pain
3.1.2.3	XR Control and Implantable Neurostimulator for Pain Relief in Chronic Pain Patients Requiring Advanced Pain Management
3.1.2.4	VR for Pain Management Training Using Gamification for Adults with Chronic Pain Seeking Self-Management Tools
3.1.2.5	VR for Pain Management Using Cognitive Behavioral Techniques for Patients Undergoing Chronic Pain Therapy

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No.	Evidence-Based MXR Taxonomy (Technology, Purpose, End-User)
3.1.2.6	Wearable XR Device for Nerve Stimulation Therapy for Patients Suffering from Chronic Pain
3.1.2.7	VR for Pain and Anxiety Reduction Using Hypnosis Sessions for Patients Seeking Alternative Therapies
3.1.2.8	VR for Pain Management Combined with Biofeedback and Analytics for Patients and Clinicians Monitoring Progress
3.1.2.9	VR for Pain and Emotion Management Using Body Mapping Therapy for Patients Managing Chronic Pain
3.1.2.10	VR for Neuromuscular Rehabilitation Using Games for Patients Needing Rehabilitation
3.1.3	VR for Anxiety Management
3.1.3.1	VR for Managing Anxiety and Panic Attacks Using Breathing Techniques for Individuals Experiencing Anxiety Disorders
3.1.3.2	VR for Relaxation and Breathing Modulation for Patients and Practitioners for Acute Stress Relief
3.1.3.3	VR for Anxiety Management Using Guided Meditation and Relaxation for Patients Needing Techniques
3.1.3.4	VR Fear and Anxiety Management During Treatment for Patients Undergoing Medical Treatments
3.2	***XR Clinical Therapy***
3.2.1	VR for Clinical Exposure Therapy
3.2.1.1	VR for Clinical Exposure Therapy for Phobias Using Simulated Environments for Therapists Treating Patients
3.2.1.2	VR for Self-Treatment Exposure Therapy for Phobias and Anxiety Disorders for Mental Health Patients
3.2.1.3	VR for Social Anxiety Exposure Therapy Using Virtual Scenarios for Patients with Social Anxiety Disorders
3.2.1.4	VR for Anxiety Management in Children Using Gamification for Children with Anxiety Disorders
3.2.2	XR for Clinical PTSD Treatment
3.2.2.1	VR for PTSD Therapy Using Simulated Combat Environments for Veterans and Patients with PTSD
3.2.2.2	VR for PTSD Treatment in Military Training for Military Personnel Undergoing Therapy
3.2.3	XR for Clinical Neurodiversity Management Therapy
3.2.3.1	VR for ADHD Treatment Using Therapeutic Games for Children
3.2.3.2	VR for Autism Therapy and Skills Development for Individuals with Autism Spectrum Disorder
3.2.3.3	AR for Communication Skills Training for Parents of Autistic Children for Parents and Caregivers
3.2.4	XR for Psychiatric Disorder Treatments
3.2.4.1.	VR for Treatment of Psychosis Therapy for Patients Seeking Alternative Treatment Options
3.2.4.2	VR for Auditory Hallucinations Treatment Using Avatar Interaction for Patients Experiencing Hallucinations
3.2.4.3	XR for Behavioral Therapy in Psychiatric Disorders Using Digital Therapeutics for Patients with Substance Use Disorders
3.2.4.4	XR for Opioid Use Disorder Behavioral Therapy for Patients Unresponsive to Traditional Treatments
3.2.5	XR for Treatment of Clinical Depression
3.2.5.1	VR for Treatment of Depression for Patients Exploring Alternative Anti-Depression Therapies
3.2.5.2	VR for Treatment of Depression Using Psychedelic Simulation for Patients Undergoing Therapy
3.3	***XR Specialized Therapeutic Interventions***
3.3.1	VR for Nicotine Dependence Treatment for Individuals Aiming to Quit Smoking

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No.	Evidence-Based MXR Taxonomy (Technology, Purpose, End-User)
3.3.2	VR for Virtual Embodiment Therapy Allowing Interaction with Representations for Patients Benefiting from Perspective-Taking
3.3.3	VR for Automated Therapy with Virtual Agents Providing Interactive Sessions for Patients Engaging with Virtual Therapists
3.3.4	VR for COPD Rehabilitation Using Therapeutic Meditation for Patients with Chronic Obstructive Pulmonary Disease
3.3.5	VR for Chronic Insomnia Treatment Using Therapeutic Meditation for Individuals Suffering from Insomnia
3.3.6	VR for Art Therapy Providing Creative Expression for Patients Seeking Art-Based Therapies
3.3.7	VR for Paediatric Therapy Using Virtual Sandtray Play Therapy for Therapists Working with Children
3.4	***XR Physical and Neuro Rehabilitation***
3.4.1	XR for Physical Rehabilitation Using VR Exercises for Patients Requiring Physical Therapy
3.4.2	VR for Rehabilitation Using Guided Meditation and Relaxation for Patients Undergoing Physical Rehabilitation
3.4.3	XR for Movement Rehabilitation Using Motion Tracking for Patients Needing Rehabilitation
3.4.4	XR for Physical Rehabilitation Using VR Games for Patients Benefiting from Gamified Therapy
3.4.5	VR for Rehabilitation in Children with Motor Impairment for Pediatric Patients with Cerebral Palsy
3.4.6	XR for Neurorehabilitation in Neurological Conditions for Patients Recovering from Stroke or Brain Injury
3.4.7	VR for Upper Limb Motor Rehabilitation Using Physiotherapy Games for Children Requiring Therapy
3.4.8	VR for Motor Rehabilitation Using Fun Activities for Patients Seeking Engaging Therapy
3.4.9	VR for Motor Rehabilitation Using Interactive Games for Patients Undergoing Motor Skill Rehabilitation
3.4.10	VR for Occupational Therapy for Patients Needing Remote Therapy
3.5	***XR Intraoperative Interventions***
3.5.1	Intraoperative 3D AR Visualization Using Real-Time Imaging for Surgeons Requiring Enhanced Visualization
3.5.2	VR for Intraoperative Surgical Visualization for Surgeons Seeking Visualization Enhancements
3.5.3	MR for Surgical Navigation with Integrated Imaging for Surgeons Needing MR Guidance
3.5.4	AR for Intraoperative Visualization of Tissue Perfusion for Surgeons Monitoring Tissue Viability
3.5.5	AR for Interventional Suite Integrating Imaging and Navigation for Surgeons Performing Procedures
3.5.6	AR for Enhancing Surgery Capabilities for Surgeons Requiring Augmented Assistance
3.5.7	MR Telepresence for Surgical Collaboration Allowing Remote Expert Assistance for Surgeons Collaborating Remotely
4	**CARE and POST-OPERATIVE TREATMENT**
4.1	***VR Fall Prevention Training for Elderly Patients***
4.1.1	VR for Fall Prevention Using Balance and Mobility Exercises for Elderly Patients at Risk of Falls
4.1.2	VR for Fall Prevention Training with Interactive Environments for Seniors Needing Strategies
4.2	***360° Video-Based Virtual Reminiscing for Geriatric Care***
4.2.1	360° Video for Reminiscence Therapy Using Video Experiences for Elderly Individuals and Dementia Patients
4.3	***VR End-of-Life Existential Suffering Solutions***
4.3.1	VR for Alleviating Existential Suffering for Palliative Care Patients

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No.	Evidence-Based MXR Taxonomy (Technology, Purpose, End-User)
4.3.2	VR for Mindfulness and Relaxation in End-of-Life Care for Patients Seeking Peace
4.4	VR Therapeutic Meditation for Palliative Care
4.4.1	VR for Guided Meditation Specifically Designed for Palliative Patients
4.5	***VR Guided Hospice Care for Patients***
4.5.1	VR for Hospice Care Experiences Providing Comfort and Relaxation for Hospice Patients
4.6	***XR Smart Glasses and Assistive Devices***
4.6.1	AR Smart Glasses for Visual Interpretation Services for Individuals with Visual Impairments
4.6.2	XR Eye-Tracking Interface for Musical Instruments for Individuals with Physical Disabilities

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