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Patient Care through Interrelationship Between Radiology Emergency Medicine, Mental Health Support, and Oral Health in Managing Acute and Chronic Conditions

Abdulatif Yousef Almuqahwi[1], Adel Hassan Alhaddad[2], Uthman Bakheet Saeed Alzahrani[3], Essa Hlal AlSaigh[4], Hawazin Majdi Abduljalil[5], Mansour Ali Askar[6], Nora Ahmad Aldlijan[7], Rabab Abdullah Almusabeh[8], Mona Fayin Saleh Almansouri[9], Rawan Bakhit AlJohani[10]

[1] Radiological Technician, Al-Salihiya Primary Health Care Center, Al Hasa, Saudi Arabia

[2] Doctor, Al-Salihiya Primary Health Care Center, Al Hasa, Saudi Arabia

[3] Psychology, Moh Jeddah
Email: uthmancpr@gmail.com

[4] Paramedic, Dammam Medical Complex
Email: essa.alsaigh@gmail.com

[5] Dentist (Endodontic Treatment), King Fahad Hospital (Dental Department)
Email: Dr.hawazin@hotmail.com

[6] Emergency Medical Specialist, Eastern Health Cluster
Email: mansour.a158@gmail.com

[7] Nursing, King Fahad Hospital Hofuf
Email: NALDLIJAN@MOH.GOV.SA

[8] Nursing Technician, King Fahad Hospital Hofuf
Email: rabab.2015arar@gmail.com

[9] Medical Resident, GP in Endocrine and Diabetic Center, Makkah Health Cluster, Saudi Arabia
Email: MFALMANSOURI@moh.gov.sa

[10] GP, Ohud Hospital, Madinah
Email: rawaniaklod21@gmail.com

Abstract:

The effective management of both acute medical crises and chronic conditions necessitates a fundamental dismantling of traditional healthcare silos, specifically through the intentional integration of emergency medicine, mental health support, and oral health. These domains are inextricably linked in a dynamic, bidirectional relationship that dictates patient outcomes. In the emergency department, undiagnosed oral pathologies can manifest as systemic infections or pain crises, while psychological distress alters pain perception, compliance, and communication, complicating diagnosis and treatment. Conversely, the trauma of a medical emergency can precipitate or exacerbate mental health disorders. For chronic diseases, this triad creates vicious cycles: poor mental health leads to neglect of oral and physical health, which worsens chronic conditions like diabetes and cardiovascular disease, leading to increased suffering, complications, and eventual emergency department recidivism. Therefore, a paradigm shift towards a collaborative, patient-centered model is essential. This involves embedding mental health professionals and teledentistry in emergency settings, incorporating oral health screening and psychological assessment into routine medical care, and developing shared care plans across disciplines. By recognizing and operationalizing these interrelationships, healthcare systems can move from reactive, fragmented interventions to proactive, holistic care that addresses the complete biopsychosocial needs of the individual, ultimately improving diagnostic accuracy, therapeutic outcomes, and long-term well-being.

Keywords: Integrated patient care, holistic healthcare, emergency medicine, mental health support, oral-systemic health link, interdisciplinary collaboration

Introduction

The contemporary healthcare landscape, for all its technological sophistication and specialized advances, often operates within a framework of compartmentalization. Clinical disciplines develop deep expertise within their respective anatomical or physiological domains, creating silos of knowledge and practice. While this specialization has undeniably driven progress, it can inadvertently lead to a fragmented patient experience, particularly for individuals presenting with complex, multifactorial health issues. This fragmentation is acutely evident at the critical intersection of three seemingly distinct fields: emergency medicine, mental health support, and oral health. Emergency departments (EDs) globally function as the front line of medical crisis intervention, designed for rapid assessment, stabilization, and disposition of patients with acute, often life-threatening conditions [1]. Concurrently, mental health disorders represent a staggering global burden, with individuals experiencing these conditions frequently utilizing emergency services during crises, yet often finding the system ill-equipped to address their nuanced psychological needs within a milieu oriented toward physical trauma [2]. Parallel to this, oral health remains persistently segregated from systemic healthcare, despite overwhelming evidence establishing the oral cavity as a mirror to general health and a pivotal site for pathogenic processes that influence and are influenced by chronic diseases [3]. The traditional model that views these three domains—the acutely physical, the psychological, and the dento-oral—as separate entities is not only outdated but clinically counterproductive. It fails to capture the complex biopsychosocial reality of the patient.

Therefore, a paradigm shift is urgently required—one that moves from a siloed approach to an integrated, interrelational model of care. In the high-stakes environment of the ED, a patient's psychological state can dramatically alter pain perception, compliance with treatment, and the ability to provide an accurate history, while undiagnosed oral infections can be the hidden source of sepsis or exacerbate systemic conditions like diabetes and cardiovascular disease [4]. Conversely, the experience of a medical emergency is itself a potent psychological stressor that can precipitate or worsen mental health conditions, necessitating immediate and follow-up psychosocial support integrated into the care pathway [5]. For chronic conditions, this triad's interconnection is even more pronounced. Poor oral health, often stemming from or contributing to mental health challenges like depression or anxiety, can impede the management of diabetes, worsen cardiovascular outcomes, and complicate rheumatoid arthritis, leading to cycles of deterioration that may eventually culminate in emergency visits [6]. The patient with severe, untreated dental pain and associated anxiety may self-medicate, neglect chronic disease management, or present to the ED in crisis, where the root oral cause might be missed if a holistic view is not applied.

This integrated perspective is not merely an academic exercise; it is a practical necessity for enhancing diagnostic accuracy, improving therapeutic interventions, reducing preventable ED recidivism, and ultimately fostering long-term wellness. The emergency physician must be equipped to identify oral health signs indicative of systemic disease or neglect and to recognize behavioral health crises that manifest as somatic complaints. Mental health professionals supporting patients in or after an ED visit must understand how physical health crises and chronic pain, including orofacial pain, impact psychological wellbeing. Dentists and oral health physicians must be vigilant for signs of systemic illness and mental distress, acting as crucial entry points to the broader healthcare system [7, 8].

The Emergency Department as the Clinical Nexus:

The modern Emergency Department is a unique and pressurized microcosm of the healthcare system, characterized by high acuity, diagnostic uncertainty, and the imperative for rapid decision-making. It serves as a catchment net for society's most urgent health crises, from trauma and myocardial infarction to psychiatric emergencies and severe infections. Within this chaotic environment, patients arrive not as curated cases from a single specialty, but as complex individuals whose presenting complaint is frequently just the tip of a multifaceted iceberg involving intertwined physical, psychological, and social determinants of health [9]. The traditional ED model, optimized for linear, protocol-driven management of isolated conditions like stroke or fracture, struggles when confronted with this

complexity. A patient may present with chest pain—a core emergency medicine concern—but the etiology could be cardiac, but it could also be a panic attack rooted in an anxiety disorder, or referred pain from a severe dental abscess affecting the trigeminal nerve pathways. Disentangling this web requires an awareness that extends beyond the electrocardiogram and troponin assay.

The concept of the ED as a nexus is particularly relevant for vulnerable populations. Individuals with severe mental illness (SMI), such as schizophrenia or bipolar disorder, have higher rates of physical comorbidities, including cardiovascular disease, diabetes, and respiratory illnesses, often under-diagnosed and poorly managed [10]. They frequently access care through the ED, not only during acute psychiatric decompensation but also for somatic complaints. In these encounters, diagnostic overshadowing—the attribution of physical symptoms to the patient's known mental health condition—is a significant risk. A complaint of abdominal pain may be dismissed as somatic preoccupation, potentially missing a surgical emergency. Furthermore, the sensory overload, bright lights, and lack of privacy in a typical ED can be profoundly destabilizing for someone experiencing psychosis or severe anxiety, potentially escalating the situation and complicating medical evaluation [11]. Therefore, the emergency clinician's ability to conduct a patient-centered assessment that respectfully integrates mental status evaluation with physical exam is paramount. This includes employing de-escalation techniques, ensuring a calmer environment when possible, and actively collaborating with psychiatric emergency services or liaison teams where available.

Similarly, oral health crises frequently funnel into the ED. Dental pain, facial cellulitis from odontogenic infections, post-extraction bleeding, and traumatic dental injuries are common presentations. However, ED providers often receive minimal training in dental diagnosis and management. The standard response may be limited to analgesia and antibiotics, with a referral for definitive dental care, which the patient may be unable to access due to financial, transportation, or psychosocial barriers [12]. This stopgap approach fails to address the underlying problem. More critically, an untreated oral infection can lead to Ludwig's angina (a life-threatening neck space infection), sepsis, or the spread of bacteria that worsen valvular heart disease (infective endocarditis). The ED, therefore, represents a critical opportunity not only for acute management of dental emergencies but also for screening and referral. Simple observations—such as extensive caries, poor oral hygiene, or signs of methamphetamine use ("meth mouth")—can be vital clues to underlying systemic issues, nutritional deficits, substance use disorders, or mental health conditions that contribute to self-neglect [13]. By viewing the oral cavity as an integral part of the physical exam, the emergency practitioner can uncover diagnostic clues and initiate referrals that break a cycle of neglect. The ED's role thus expands from being a reactive crisis center to a proactive node of detection and linkage, connecting patients with dental and mental health resources embedded within the community care continuum.

The Inseparable Duo: Mental Health in the Context of Acute and Chronic Medical Care

The relationship between mental and physical health is not merely concurrent; it is deeply causative and bidirectional, forming a vicious or virtuous cycle that profoundly impacts disease presentation, progression, and outcomes. In the emergency setting, psychological factors are inextricably linked to the experience of acute illness or injury. The physiological stress response triggered by a medical crisis—involving the hypothalamic-pituitary-adrenal (HPA) axis and sympathetic nervous system—can exacerbate pre-existing mental health conditions, such as triggering a manic episode in bipolar disorder or severe anxiety in someone with panic disorder [14]. Conversely, the cognitive and emotional state of a patient significantly influences the clinical encounter. A patient with delirium or dementia may be unable to provide a history; a severely depressed individual may minimize symptoms; a person in a state of psychotic agitation may be unable to cooperate with a lifesaving procedure. This makes the integration of mental health assessment, or at a minimum, mental health-informed communication and de-escalation skills, a core competency for all emergency care providers.

For chronic conditions, this interplay is the rule rather than the exception. Depression is a well-established independent risk factor for the development and poor prognosis of coronary artery

disease, with mechanisms involving inflammation, platelet aggregation, and reduced adherence to medication and lifestyle advice [15]. Anxiety disorders can worsen asthma control and are linked to irritable bowel syndrome. The diagnosis of a life-altering chronic illness like cancer, diabetes, or renal failure is itself a potent psychological stressor that can lead to adjustment disorders, depression, and anxiety, which in turn can impair the patient's capacity to manage their complex treatment regimens. This creates a downward spiral: poor mental health leads to worse physical health management, leading to deteriorating physical health, which further worsens mental health. The ED often sees the catastrophic endpoints of this spiral—the diabetic patient in ketoacidosis after stopping insulin due to depression, or the heart failure patient in acute pulmonary edema exacerbated by anxiety-induced tachycardia and non-adherence to diuretics [16].

Therefore, effective management of chronic disease is impossible without addressing mental wellbeing. This necessitates moving beyond the traditional model where mental health support is a separate, stigmatized, and often inaccessible referral. Integrated care models, such as the collaborative care model, demonstrate that outcomes improve when mental health professionals (e.g., psychiatrists, psychologists, clinical social workers) are embedded within primary care and specialty medical teams [17]. In the context of our triad, this integration must extend into pathways that originate in the ED. For instance, an ED visit for a non-fatal opioid overdose should automatically trigger a warm handoff to addiction and mental health services. A patient presenting with recurrent, unexplained somatic symptoms should be screened for underlying anxiety or depression. Screening tools like the PHQ-9 for depression or GAD-7 for anxiety can be briefly administered in appropriate ED settings, not to provide definitive diagnosis but to identify need and facilitate connection to care [18]. By normalizing the assessment of psychological distress as part of comprehensive medical care, the healthcare system can begin to interrupt the destructive cycles linking mental and physical illness, reducing preventable suffering and ED utilization.

The Oral-Systemic Health Connection: Beyond the Teeth and Gums

For decades, dentistry and medicine have followed parallel but separate paths, a divide reflected in education, financing, and clinical delivery. This separation has fostered a dangerous misconception that oral health is somehow optional or cosmetic, rather than foundational to overall health. A robust body of evidence now irrefutably establishes the mouth as a critical site of pathology with systemic repercussions. The primary mechanism underlying this connection is chronic inflammation, often originating from periodontal disease—a bacterially induced inflammatory destruction of the tissues supporting the teeth [19]. Periodontal pathogens and their byproducts, as well as inflammatory mediators like C-reactive protein (CRP), interleukin-6 (IL-6), and tumor necrosis factor-alpha (TNF-α), can enter the systemic circulation, contributing to a state of low-grade, chronic inflammation that exacerbates or increases susceptibility to a range of conditions.

The most researched links are with cardiovascular disease. Periodontal disease is associated with an increased risk of atherosclerosis, myocardial infarction, and stroke. Proposed mechanisms include direct bacterial effects on blood vessels (e.g., *Porphyromonas gingivalis*), the systemic inflammatory burden increasing plaque instability, and the cross-reactivity between bacterial and human heat shock proteins promoting an autoimmune response [20]. In diabetes, the relationship is powerfully bidirectional. Diabetes mellitus, especially when poorly controlled, increases the risk and severity of periodontal disease due to impaired immune response and microvascular changes. Conversely, severe periodontitis can worsen glycemic control by increasing insulin resistance, creating a vicious cycle that complicates diabetes management and elevates the risk of diabetic complications [21]. For patients with diabetes, an ED visit for hyperglycemia or an infection should prompt an inquiry into their oral health status, as treating periodontitis can be an adjunct to improving HbA1c levels.

The connections extend further. Periodontal inflammation has been implicated in adverse pregnancy outcomes (pre-term birth, low birth weight), likely due to inflammatory mediators crossing the placental barrier [22]. Associations

exist with rheumatoid arthritis, likely sharing common inflammatory pathways, and with respiratory diseases like pneumonia and COPD, where oral bacteria can be aspirated into the lungs [23]. Furthermore, the mouth is often the first site to manifest signs of systemic diseases: oral ulcers in autoimmune conditions like lupus or Crohn's disease, candidiasis in immunocompromised states, gingival hyperplasia from certain medications, and telangiectasias in hereditary hemorrhagic telangiectasia. For the emergency physician, a careful oropharyngeal exam can reveal clues to undiagnosed HIV (hairy leukoplakia, Kaposi's sarcoma), leukemia (gingival bleeding, hypertrophy), or nutritional deficiencies (glossitis, angular cheilitis) [24]. Therefore, oral health cannot be dismissed as a mere specialty concern. It is a vital sign, a diagnostic window, and a modifiable risk factor for systemic health. Integrating basic oral health screening and awareness into medical triage, history-taking, and discharge planning is a low-cost, high-yield strategy for improving comprehensive patient care and preventing future complications that lead to ED returns.

Synthesizing the Triad: Integrated Models for Acute and Chronic Care Management

Recognizing the interrelationships is the first step; building healthcare systems that operationalize them is the formidable yet essential next challenge. An integrated model of care for the emergency medicine-mental health-oral health triad requires intervention at multiple levels: clinical protocols, interdisciplinary collaboration, health information technology, and payment structures. In the acute setting, the ED itself must be re-envisioned. One promising approach is the co-location of services. This could involve having a psychiatric emergency clinician or a clinical social worker physically present in or on immediate call to the ED to provide real-time assessment, crisis intervention, and initiation of treatment plans for patients presenting with behavioral health needs [25]. Similarly, some forward-thinking hospital systems have explored teledentistry consultations from the ED, where an off-site dentist can review images or conduct a video consultation to guide management of dental emergencies, ensuring appropriate antibiotic selection, pain management, and facilitating a direct appointment for definitive care, thereby reducing ineffective prescriptions and follow-up failures [26].

For chronic disease management, the integrated model moves upstream and into the community. The Patient-Centered Medical Home (PCMH) model, when fully realized, should include not only primary care and behavioral health but also have established, streamlined referral pathways to dental care. Dental hygienists could be integrated into primary care teams to conduct screenings and preventive education, especially for high-risk populations like diabetics, pregnant women, and those with cardiovascular disease [27]. A crucial element is shared care plans and effective communication. A patient with schizophrenia, diabetes, and severe periodontitis requires a coordinated plan involving their psychiatrist, endocrinologist, and periodontist, with each specialist aware of the treatments and challenges reported by the others. Electronic health records (EHRs) that are truly interoperable between medical, dental, and behavioral health settings—though currently a rarity—are a critical technological enabler for this kind of coordination [28].

A powerful illustration of this synthesis is the management of chronic non-cancer pain, including orofacial pain conditions like temporomandibular joint disorders (TMD) and trigeminal neuralgia. These patients often cycle between primary care, dentistry, neurology, and the ED in search of relief. A truly integrated approach would involve a pain management team that includes a physician for pharmacological management, a dentist or orofacial pain specialist for occlusal and joint assessment, and a psychologist to address the inevitable anxiety, depression, and catastrophizing that accompany chronic pain, often utilizing cognitive-behavioral therapy (CBT) and biofeedback [29]. The ED's role in this pathway is to recognize these complex pain syndromes, avoid the perpetuation of opioid-centric treatment, and refer directly into such a multidisciplinary pain program. Another critical population is older adults. Geriatric patients often have multiple chronic conditions, polypharmacy (which causes xerostomia, increasing caries and periodontal risk), and a high prevalence of cognitive impairment and depression. An ED visit for a fall may be precipitated by dizziness from medication, which was prescribed for pain from neglected dental issues, all against a backdrop of mild dementia. A geriatric ED or a geriatric assessment team that can evaluate medical, functional, cognitive, and social

domains—including oral health and medication review—can make transformative disposition and follow-up plans [30].

Challenges, Future Directions, and Conclusion

Despite the compelling rationale, significant barriers impede the widespread adoption of this integrated triad model. The most profound is the entrenched siloing of healthcare professions in education, licensure, and practice. Medical students receive scant training in oral health or in-depth behavioral health intervention; dental students may learn systemic connections but have limited clinical rotation in medical settings; and mental health training programs may not emphasize the physical manifestations of psychiatric illness or the nuances of medical comorbidities [31]. Financial structures pose another immense hurdle. In many countries, including the United States, dental insurance is separate from medical insurance, and reimbursement for behavioral health services is often inadequate and fraught with administrative barriers. There is little financial incentive for an ED to employ a dentist or for a medical plan to pay for periodontal treatment for a diabetic member, despite evidence of cost savings from reduced complications [32]. Cultural and professional territoriality, stigma surrounding mental illness and dental decay, and a lack of interoperable health records further complicate integration.

Overcoming these challenges requires multipronged advocacy and innovation. Educational reform is fundamental. Interprofessional education (IPE) initiatives that bring medical, nursing, dental, pharmacy, and social work students together to solve simulated patient cases can break down stereotypes and build collaborative skills early [33]. Policy changes are needed to create blended payment models that reward outcomes—like reduced hospital admissions or improved diabetes control—rather than volume of isolated procedures, thereby incentivizing coordinated care across disciplines. The expansion of integrated practice units (IPUs) organized around patient conditions (e.g., a “diabetes health home” with co-located endocrinology, podiatry, ophthalmology, dentistry, and behavioral health) is a promising structural innovation [34]. Technological solutions, such as secure shared care planning platforms that transcend traditional EHR boundaries, must be developed and adopted.

Conclusion:

In conclusion, the management of both acute emergencies and chronic diseases can no longer be viewed through a narrow, single-discipline lens. The patient is a unified whole, and their health is dictated by the dynamic interplay of their physical, psychological, and oral wellbeing. The emergency department, as the point of entry for so many in crisis, has a unique responsibility and opportunity to act as the catalyst for a more integrated approach. By ensuring that emergency providers are trained to recognize the oral signs of systemic disease and the psychological dimensions of physical complaints, by embedding support mechanisms within the ED, and by building robust referral bridges to dental and mental health services, we can begin to mend the fragmentation of care. Similarly, chronic disease management programs must intentionally incorporate oral health screening and mental health support as standard components. The evidence is clear: periodontal treatment improves glycemic control, cognitive-behavioral therapy improves chronic pain outcomes, and addressing depression reduces cardiac mortality. The path forward is one of deliberate collaboration, systemic redesign, and a unwavering commitment to a holistic vision of the patient. Only by embracing the essential interrelationship between emergency medicine, mental health support, and oral health can we hope to provide care that is not only effective in the moment of crisis but also transformative in fostering long-term health and resilience.

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