ATYPICAL FACIAL PAIN – AN UPDATED REVIEW WITH A DETAILED DIFFERENTIAL DIAGNOSIS

*1Dr. K. Saraswathi Gopal and 2Dr. Prakash Vijayan Bhoopalan

1Professor and Head, Dept. of Oral Medicine and Radiology, Meenakshi Ammal Dental College and Hospital.
2PG Student, Dept. of Oral Medicine and Radiology, Meenakshi Ammal Dental College and Hospital.

ABSTRACT

Persistent idiopathic facial pain (PIFP) originally known as Atypical facial pain is variable in its presentation. Often it is characterized by continuous, recurrent pain of variable intensity. Typically, the pain is deep and poorly localized, is described as dull and aching, and does not awake the patient from sleep. At onset, the pain may be confined to a limited area on one side of the face, while later it may spread to involve a larger area. It is imperative to arrive at a proper diagnosis as atypical facial pain is a diagnosis of exclusion. Differential diagnosis includes various forms of pain ranging from dental, non-dental and neuropathic origin. A proper diagnosis of atypical facial pain will guide the clinician in stepwise treatment of the pain.

KEYWORDS: Atypical facial pain, Persistent idiopathic facial pain, Diagnosis, Differential diagnosis, Management.

ABBREVIATIONS

International Headache society - (IHS); Persistent Idiopathic Facial Pain - (PIFP); International Association for the Study of Pain (IASP), Magnetic Resonance Imaging (MRI), Visual Analog Scale (VAS), Short-lasting unilateral neuralgiform headache attacks with cranial autonomic symptoms (SUNA), Short-lasting unilateral neuralgiform headache with conjunctival injection and tearing (SUNCT).
INTRODUCTION

Atypical facial pain, which carries the synonyms of atypical facial neuralgia, idiopathic facial pain and chronic facial pain, is a persistent facial pain that does not have the characteristics of the cranial neuralgias, is not associated with the physical signs and does not demonstrate organic causes – IHS(International Headache Society - Olesen 1988, Zakrzewska 2002).\[1\]

The most commonly used word from McGill’s pain questionnaire is ‘nagging’; ‘shooting’ and ‘sharp’ are used less frequently. On the assumption that the cause is dental, 75% of patients undergo unnecessary dental treatment (Mock et al 1985). These patients often have a long history of pain without clear onset and complain of increasing pain after craniofacial surgery (Zakrzewska & Feinmann 1990). Over time, the pain may spread to involve wider areas of the face or jaws. The pain is called “atypical” because it is a different type of pain than that of a typical toothache. The diagnosis is often used when the cause is unknown and all terminology has been exhausted (Mock et al 1985).\[1,4\]

According to the International Association for the Study of Pain (IASP - 1979), pain is the subject’s conscious perception of modulated nociceptive impulses that generates an unpleasant sensory and emotional experience associated with actual or potential tissue damage or described in terms of such damage. Chronic pain is defined as a persistent pain that is not amenable as a rule to treatment based on specific remedies or to routine methods of pain control such as narcotic analgesics. Chronic pain has been defined as pain that persists past the normal time of healing, but this may not be an easy determination.\[1,2\]

Somatization is defined as a tendency to experience and communicate pathological distress in form of physical symptoms in the absence of any pathological finding, to attribute them to physical illness and to seek medical help for them.\[3\]

Atypical facial pain can occur without a specific cause, due to facial trauma or basal skull fracture which leads to damage of the trigeminal nerve. Atypical facial pain is a term reserved for only those cases in which a definite diagnosis is not possible and in which there is realization that surgical treatment holds little promise of aiding the patients. (Rushton et al).\[1\]

The International Headache Society defines PIFP (Persistent idiopathic facial pain) as follows:\[5\]

- Pain is in the face
- Pain is present daily and persists for most of the day
Pain is confined at onset to a limited area on one side of the face and is deep and poorly localized.

In addition, the pain is not associated with sensory loss or other physical signs, with no abnormalities in laboratory or imaging studies.

PIFP (Persistent idiopathic facial pain) usually does not have a specific cause; however, injury of the trigeminal nerve proximally or distally may lead to this disorder. Demyelination, either central or peripheral, may initiate PIFP symptoms.

Atypical facial pain presents as an aching, burning, nagging pain. Deep structures of the face or scalp are commonly affected and patients find it difficult to describe. It is poorly localized and does not conform to the anatomical boundaries of sensory nerve supply. Characteristic symptoms of Atypical facial pain are different intensity and unilateral pain to pain affecting the whole face. In certain cases, the pain is bilateral. Usually it is constant, but though exacerbations lasting for hours or days may occur the patient is never free from pain. It worsens continually or episodically and is enhanced by stress and often connected with pain elsewhere in the body. Cold, fatigue, anxiety and depression can intensify the pain.[1,4]

Approach to atypical facial pain diagnosis involves a detailed history which comprises of initially allowing time for the patient to complete their opening statement. The pain history needs to include details on; Timing which includes onset, duration and periodicity. Location and radiation (e.g. within nerve distribution). Quality and severity, aggravating and relieving factors (e.g. effect of hot, cold sweet foods, prolonged chewing, eating, brushing of teeth, touching the face, weather, physical activity, posture, stress, and tiredness), associated factors (e.g. taste, salivary flow, clenching, bruxing habits, locking or clicking of jaw joint, altered sensation, nasal, eye, or ear symptoms). Other pain conditions (e.g. headaches, migraines, chronic widespread pain and fibromyalgia) impact of pain (e.g. sleep, mood, concentration, fatigue, beliefs and quality of life), psychological assessment of the patient, a detailed family history, social history & significant life events need to be determined along with a full drug history and a complete past and present medical history.[6]

Extraoral examination of a patient with atypical facial pain comprises of assessing whether the pain is confined generally to the head and neck region. Visual inspection to detect any colour changes, swellings and skin lesions. Palpation of lumps or salivary glands may be
indicated in some circumstances. Examination includes the muscles of mastication, head and neck muscles for tenderness and trigger points, muscle hypertrophy and movement of the temporomandibular joint including crepitus. The cranial nerves also need to be examined.\textsuperscript{[6]}

On intraoral examination, hard tissues and teeth are to be evaluated for obvious dental pathology including decay, mobile teeth, excessive wear facets (indicating bruxism), occlusion, ability to open and close the mouth, fixed or removable appliances. The oral mucosa is examined for soft tissue lesions.\textsuperscript{[6]}

As pain is subjective, it is useful to use questionnaires to help in assessment and monitoring of effects of therapy. Questionnaires such as Brief pain inventory and Visual analog scale to evaluate the mood evaluation of the patient, Hospital anxiety and depression scale to determine the presence of depression and anxiety, McGill pain questionnaire to evaluate a sensory component and Oral impact on daily performance can be used to assess the pain.\textsuperscript{[6]}

Laboratory investigations are not of great importance in case of atypical facial pain. Imaging is especially important for dental pain and consists mainly of local X-rays which can be carried out in every dental practice. Dental panoramic radiographs are very useful for bony lesions or cysts and are available in most hospitals but also in larger dental practices. Salivary gland diseases are best investigated using ultrasonography. Magnetic resonance imaging (MRIs) and computerized tomography (CTs) are indicated in some conditions.\textsuperscript{[6]}

Differential Diagnosis which can be considered for atypical facial pain includes many conditions. It can be broadly divided as dental and musculoskeletal pain and Neuropathic & other non-dental pain. Dental and musculoskeletal pain comprises of dental caries, reversible pulpitis, irreversible pulpitis, dentinal sensitivity, periodontal disorders, pericoronitis, premature contact, cracked tooth, alveolar osteitis, maxillary sinusitis, sialolith and temporomandibular joint disorders.\textsuperscript{[7,8,9,10,11,12,13,14,15,16 17]} (Table 1&2).

Neuropathic and other non-dental pain comprises of post herpetic neuralgia, post traumatic trigeminal pain, atypical odontalgia, burning mouth syndrome, trigeminal neuralgia, glossopharyngeal neuralgia, SUNA/SUNCT (Short-lasting unilateral neuralgiform headache attacks with cranial autonomic symptoms/Short-lasting unilateral neuralgiform headache with conjunctival injection and tearing), giant cell arteritis and post stroke pain.\textsuperscript{[1]} (Table 3 & 4)
**TABLE 1 - Differential diagnosis of atypical facial pain with pains of dental and musculoskeletal origin**

<table>
<thead>
<tr>
<th>DISORDER</th>
<th>ATYPIICAL FACIAL PAIN</th>
<th>DENTAL CARIES</th>
<th>REVERSIBLE PULPITIS</th>
<th>IRREVERSIBLE PULPITIS</th>
<th>DENTAL SENSITIVITY</th>
<th>PERIODONTAL DISORDERS</th>
<th>PERICORONITIS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local radiation</td>
<td>Non-anatomical, may involve 2 or more nerves</td>
<td>Local tooth</td>
<td>Local tooth</td>
<td>Difficult to localise, diffuse or referred</td>
<td>Local tooth</td>
<td>Local teeth</td>
<td>Partially erupted tooth most commonly wisdom tooth</td>
</tr>
<tr>
<td>Timing</td>
<td>Continuous with periods of exacerbations</td>
<td>Intermittent and based on the length of stimuli</td>
<td>Intermittent, few seconds to minutes</td>
<td>Intermittent – continuous in rare cases</td>
<td>Second to minutes depending on the stimulus</td>
<td>Intermittent and can last for few hours</td>
<td>Continuous pain</td>
</tr>
<tr>
<td>Quality/Severity</td>
<td>Aching, burning, nagging pain</td>
<td>Dull / Moderate</td>
<td>Sharp &amp; throbbing / Severe</td>
<td>Intense and spontaneous pain / moderate – severe</td>
<td>Sharp / Moderate</td>
<td>Aching, dull/ low intensity</td>
<td>Aching and throbbing / moderate to severe</td>
</tr>
<tr>
<td>Aggravating factors</td>
<td>Fatigue, anxiety and depression</td>
<td>Hot, cold and sweet foods</td>
<td>Hot, cold, sweet foods, mastication</td>
<td>Hot and cold foods, lying down in supine position</td>
<td>Cold foods and air</td>
<td>Mastication</td>
<td>Mastication – biting</td>
</tr>
<tr>
<td>Associated factors</td>
<td>Often connected with pain elsewhere in the body.</td>
<td>Food lodgement</td>
<td>Dental caries, trauma</td>
<td>Visible caries or fractured tooth</td>
<td>Food lodgement</td>
<td>Food lodgement</td>
<td>Lymphadenopathy, malaise, fever &amp; trismus</td>
</tr>
<tr>
<td>Examination</td>
<td>No significant finding</td>
<td>Visible decay or fractured restorations</td>
<td>Visible decay, tenderness on percussion</td>
<td>Tenderness on percussion</td>
<td>Visible decay, cervical abrasion, attrition of fracture of tooth</td>
<td>Tooth mobility, periodontal pocket formation &amp; pus discharge</td>
<td>Erythematous and edematous appearance of tissue covering the tooth</td>
</tr>
<tr>
<td>Investigations</td>
<td>No positive investigation findings</td>
<td>IOPA</td>
<td>IOPA</td>
<td>IOPA</td>
<td>IOPA</td>
<td>Radiographs – IOPA</td>
<td>Radiograph to confirm the position of the tooth</td>
</tr>
<tr>
<td>Management</td>
<td>Tricyclic antidepressants, cognitive behaviour therapy</td>
<td>Removal of decay and restoration of tooth</td>
<td>Pulp capping &amp; restoration or Root canal therapy</td>
<td>Root canal therapy or extraction of the tooth</td>
<td>Varnishes and fluoride application.</td>
<td>Periodontal therapy</td>
<td>Debridement, hot salt mouthwashes, antibiotics &amp; extraction if necessary</td>
</tr>
</tbody>
</table>

---

**Note:**
- **DISORDER**
  - Local radiation
  - Timing
  - Quality/Severity
  - Aggravating factors
  - Associated factors
  - Examination
  - Investigations
  - Management

**DISORDERS**
- **DENTAL CARIES**
  - Local tooth
- **REVERSIBLE PULPITIS**
  - Intermittent, few seconds to minutes
- **IRREVERSIBLE PULPITIS**
  - Intense and spontaneous pain / moderate – severe
- **DENTAL SENSITIVITY**
  - Difficult to localise, diffuse or referred

**PERIODONTAL DISORDERS**
- **PERICORONITIS**
  - Partially erupted tooth most commonly wisdom tooth

**Quality/Severity**
- Aching, burning, nagging pain
  - Dull / Moderate
  - Sharp & throbbing / Severe

**Aggravating factors**
- Fatigue, anxiety and depression
  - Hot, cold and sweet foods
  - Mastication

**Associated factors**
- Often connected with pain elsewhere in the body.
- Food lodgement
  - Dental caries, trauma
  - Visible caries or fractured tooth

**Examination**
- No significant finding
  - Visible decay or fractured restorations
  - Visible decay, tenderness on percussion
  - Tenderness on percussion

**Investigations**
- No positive investigation findings
  - IOPA
  - Radiographs – IOPA

**Management**
- Tricyclic antidepressants, cognitive behaviour therapy
  - Removal of decay and restoration of tooth
  - Pulp capping & restoration or Root canal therapy
  - Root canal therapy or extraction of the tooth
  - Varnishes and fluoride application.
  - Periodontal therapy
  - Debridement, hot salt mouthwashes, antibiotics & extraction if necessary

---

**Note:** The table provides a detailed comparison of atypical facial pain with dental and musculoskeletal origins, including symptoms, differential diagnosis, and management strategies.
## TABLE 2 - Differential diagnosis of atypical facial pain with pains of dental and musculoskeletal origin

<table>
<thead>
<tr>
<th>DISORDER</th>
<th>ATYPICAL FACIAL PAIN</th>
<th>PREMATURE CONTACT</th>
<th>CRACKED TOOTH</th>
<th>ALVEOLAR OSTEITIS</th>
<th>MAXILLARY SINUSITIS</th>
<th>SIALOLITH</th>
<th>TMDs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local radiation</td>
<td>Non-anatomical, may involve 2 or more nerves</td>
<td>Recently restored tooth</td>
<td>Difficult to localise</td>
<td>Tooth socket – recent extraction</td>
<td>Over the maxillary sinus region, unilater or bilateral - upper posterior teeth</td>
<td></td>
<td>Over the salivary gland region or in the course of the duct</td>
</tr>
<tr>
<td>Timing</td>
<td>Continuous with periods of exacerbations</td>
<td>Intermittent and based on stimulation</td>
<td>Intermittent, seconds to minutes</td>
<td>Continuous</td>
<td>Continuous</td>
<td>Intermittent</td>
<td>Intermittent</td>
</tr>
<tr>
<td>Quality/Severity</td>
<td>Aching, burning, nagging pain</td>
<td>Initially sharp</td>
<td>Sharp - dull pain / moderate</td>
<td>Sharp and deep ache – moderate</td>
<td>Dull, aching / mild to moderate</td>
<td>Dull, aching / Moderate</td>
<td>Aching and deep / variable severity</td>
</tr>
<tr>
<td>Aggravating factors</td>
<td>Fatigue, anxiety and depression</td>
<td>Occluding the teeth</td>
<td>Occluding the teeth</td>
<td>Food lodgement</td>
<td>Postural change - bending down</td>
<td>Meal time – increased salivary secretion</td>
<td></td>
</tr>
<tr>
<td>Associated factors</td>
<td>Often connected with pain elsewhere in the body.</td>
<td>History of recently restored tooth</td>
<td>History of chewing hard food material</td>
<td>Halitosis</td>
<td>Nasal discharge, history of respiratory infection or dental treatment</td>
<td>Pain and discomfort during intake of food</td>
<td></td>
</tr>
<tr>
<td>Examination</td>
<td>No significant finding</td>
<td>High points evident on checking with an articulating strip</td>
<td>Biting on cotton wool. Trans-illumination</td>
<td>Loss of clot and exposed bone</td>
<td>Tenderness over the sinus and pain on percussion of upper posterior teeth.</td>
<td>Tenderness on gland or ductal portion on bidigital palpation</td>
<td>Tenderness of joint, clicking sounds and tenderness of muscles of mastication</td>
</tr>
<tr>
<td>Investigations</td>
<td>No positive investigation findings</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Management</td>
<td>Tricyclic antidepressants, Correction of the high point to avoid</td>
<td>Extraction of the affected teeth or</td>
<td>Curettage under local anesthetic, zinc oxide</td>
<td>Antibiotic and sinus drainage</td>
<td>Manual removal if</td>
<td>Analgesics (NSAIDs), soft</td>
<td></td>
</tr>
<tr>
<td>DISORDER</td>
<td>ATYPICAL FACIAL PAIN</td>
<td>POST HERPETIC TRIGEMINAL PAIN</td>
<td>POST TRAUMATIC TRIGEMINAL PAIN</td>
<td>ATYPICAL ODONTALGIA</td>
<td>BURNING MOUTH SYNDROME</td>
<td>TRIGEMINAL NEURALGIA</td>
<td></td>
</tr>
<tr>
<td>------------------</td>
<td>---------------------</td>
<td>-----------------------------</td>
<td>-----------------------------</td>
<td>---------------------</td>
<td>-----------------------</td>
<td>---------------------</td>
<td></td>
</tr>
<tr>
<td>Local radiation</td>
<td>Non-anatomical, may involve 2 or more nerves</td>
<td>Eyes and forehead region</td>
<td>Site of injury</td>
<td>Local tooth or tooth bearing area</td>
<td>Tongue – all sites</td>
<td>Regions supplied by the trigeminal nerve. 2\textsuperscript{nd} and 3\textsuperscript{rd} divisions - commonly affected</td>
<td></td>
</tr>
<tr>
<td>Timing</td>
<td>Continuous with periods of exacerbations</td>
<td>Persistent pain</td>
<td>Persistent or may occur only in response to a stimulus,</td>
<td>Continuous</td>
<td>Continuous (mostly)</td>
<td>Paroxysmal style, 2-3 minutes, refractory period.</td>
<td></td>
</tr>
<tr>
<td>Quality/ Severity</td>
<td>Aching, burning, nagging pain</td>
<td>Burning, tingling, itchy, sharp / moderate to severe</td>
<td>Burning, tingling, can be sharp at times and very severe</td>
<td>Aching, dull, throbbing / mild to moderate</td>
<td>Burning, stinging &amp; itchy / mild to moderate</td>
<td>Sharp, shooting electric shock, aching and burning pain / Severe</td>
<td></td>
</tr>
<tr>
<td>Aggravating factors</td>
<td>Fatigue, anxiety and depression</td>
<td>Touching that region</td>
<td>Light touch.</td>
<td>Touching the region</td>
<td>Mastication / eating</td>
<td>Touch, cold wind, washing the face, eating and brushing the teeth</td>
<td></td>
</tr>
<tr>
<td>Associated factors</td>
<td>Often connected with pain elsewhere in the body.</td>
<td>History of dental procedure or trauma</td>
<td>Dry mouth, abnormal taste</td>
<td>Depression</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Examination</td>
<td>No significant finding</td>
<td>Paresthesia, Hyperesthesia,</td>
<td>Paresthesia, hyperesthesia,</td>
<td>Hyperesthesia of the area</td>
<td>No significant findings</td>
<td>Light touch evokes the pain</td>
<td></td>
</tr>
</tbody>
</table>

**TABLE 3 - Differential diagnosis of atypical facial pain with pains of neuropathic and non-dental origin**
Prakash. World Journal of Pharmacy and Pharmaceutical Sciences

<table>
<thead>
<tr>
<th>Investigations</th>
<th>No positive investigation findings</th>
<th>Intraoral radiographs</th>
<th>Exclude other than haematinics and blood glucose</th>
<th>MRI &amp; MRA (Magnetic resonance angiography)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Management</td>
<td>Tricyclic antidepressants, cognitive behaviour therapy</td>
<td>Antiviral drugs &amp; topical anesthetic agents</td>
<td>Systemic corticosteroids, TCAs</td>
<td>Cognitive behaviour therapy</td>
</tr>
</tbody>
</table>

**TABLE 4 - Differential diagnosis of atypical facial pain with pains of neuropathic and non-dental origin**

<table>
<thead>
<tr>
<th>DISORDER</th>
<th>ATYPICAL FACIAL PAIN</th>
<th>GLOSSOPHARYNGEAL NEURALGIA</th>
<th>SUNA/SUNCT</th>
<th>GIANT CELL ARTERITIS</th>
<th>POST STROKE PAIN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local radiation</td>
<td>Non-anatomical, may involve 2 or more nerves</td>
<td>Unilateral, deep in the neck or back of tongue and tonsils</td>
<td>Unilateral mainly first and 2nd division of trigeminal nerve</td>
<td>Temporal region, jaw area, may be bilateral</td>
<td>Ipsilateral, whole side of the face, periorbital</td>
</tr>
<tr>
<td>Timing</td>
<td>Continuous with periods of exacerbations</td>
<td>Paroxysmal attacks, 2-3 minutes, recurrent,</td>
<td>Rapid attacks, seconds to several minutes, no refractory period</td>
<td>Continuous – sudden onset</td>
<td>Continuous – begins after a stroke</td>
</tr>
<tr>
<td>Quality/ Severity</td>
<td>Aching, burning, nagging pain</td>
<td>Sharp shooting, electric shock like / Moderate to very severe</td>
<td>Sharp stabbing / Moderate to severe</td>
<td>Dull aching and throbbing / severe</td>
<td>Aching, burning &amp; pricking / Mild to moderate</td>
</tr>
<tr>
<td>Aggravating factors</td>
<td>Fatigue, anxiety and depression</td>
<td>Swallowing and coughing</td>
<td>Mostly spontaneous, touch evokes the pain</td>
<td>Mastication</td>
<td>Touch</td>
</tr>
<tr>
<td>Associated factors</td>
<td>Often connected with pain elsewhere in the body.</td>
<td>Syncope</td>
<td>Tearing, red eye, eye edema, rhinorrhoea, blockage and fullness of ear</td>
<td>Visual disturbance, diplopia, loss of vision malaise, fever, myalgia</td>
<td>Can occur in other areas, contralateral limbs</td>
</tr>
<tr>
<td>Examination</td>
<td>No significant finding</td>
<td>Light touch evokes the pain</td>
<td>During an attack may see some of the autonomics</td>
<td>Scalp tenderness, abnormality of temporal artery</td>
<td>Dysesthesia, allodynia</td>
</tr>
<tr>
<td>Investigations</td>
<td>No positive investigation findings</td>
<td>MRI</td>
<td>MRI including pituitary fossa</td>
<td>ESR raised, C reactive protein is increased, temporal artery biopsy</td>
<td>CT, MRI</td>
</tr>
<tr>
<td>------------------------</td>
<td>-----------------------------------</td>
<td>----------------------------</td>
<td>-------------------------------</td>
<td>-------------------------------------------------------------------</td>
<td>---------</td>
</tr>
<tr>
<td>Management</td>
<td>Tricyclic antidepressants, cognitive behaviour therapy</td>
<td>Anticonvulsants &amp; surgery</td>
<td>Lamotrigine</td>
<td>High dose corticosteroids</td>
<td>Tricyclic antidepressants, gabapentin and pregablin</td>
</tr>
</tbody>
</table>
Management begins with reassurance and careful explanation (Feinman 1990). Up to half of the patients may experience relief of symptoms with reassurance together with simple analgesics (Zakrzewska 1995). Providing a definitive diagnosis is of paramount importance. Other treatment methods include providing assurance, explanation of the condition in appropriate terms, providing realistic expectations, a clear statement that examination and investigations are negative, acknowledgment of the reality of pain, agreement that the patient is ill, allowing ventilation of patient’s beliefs and attributions, educating the patient that stress plays a role, but introducing it gradually, placebo drugs and in severe cases tricyclic antidepressants can be prescribed to patients. Finally, cognitive behaviour therapy can be suggested which has proven to be highly effective.[1, 4, 6, 18, 19, 20]

CONCLUSION
Proper history taking and use of pain questionnaires will help the clinician in narrowing down to the correct diagnosis. This in turn leads to proper treatment planning and management of the patients with pain. Clinicians should assess the pain condition keeping in mind the knowledge of various mechanisms of pain and the treatment is often multidisciplinary.

REFERENCES
2. Burket’s oral medicine – 10th edition
7. Essentials of Dental Caries: The Disease and Its Management, 3rd Ed. By Edwina Kidd
11. Practical Pain Management. edited by C. David Tollison, John R. Satterthwaite, Joseph W. Tollison
15. Occlusion. By Hamish Thomson
17. Psychosocial Factors in Pain: Critical Perspectives. edited by Robert J. Gatchel, Dennis C. Turk; Orofacial Pain. By Joanna M. Zakrzewska